95TH CONGRESS : : : : 2D SESSION

JANUARY 19–OCTOBER 15, 1978

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THE IDITAROD TRAIL

COMMUNICATION

FROM

THE ASSISTANT SECRETARY OF THE INTERIOR

TRANSMITTING

A REPORT ON THE SUITABILITY OF THE ALASKA GOLD RUSH TRAILS FOR INCLUSION IN THE NATIONAL TRAILS SYSTEM, AND A RECOMMENDATION FOR THE DESIGNATION OF A PORTION OF THE IDITAROD TRAIL AS A NATIONAL HISTORIC TRAIL, PURSUANT TO SECTION 5(b) OF PUBLIC LAW 90-543

MARCH 10, 1978.—Referred to the Committee on Interior and Insular Affairs and ordered to be printed.

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United States Department of the Interior
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

MAR 8 1978

Honorable Thomas P. O'Neill, Jr.
Speaker of the
House of Representatives
Washington, D. C. 20515

Dear Mr. Speaker:

Enclosed is the Department's report, "The Iditarod Trail (Seward to Nome) and other Alaska Gold Rush Trails", which recommends designation of the Iditarod Trail as a National Trail within the National Trails System. Since designation of the Iditarod Trail as a National Historic Trail is proposed in H.R. 39, Alaska National Interest Lands, and the Department has presented the Administration's testimony to the House Subcommittee considering that bill, draft legislation is not included with this transmittal.

The Act of October 2, 1968 (82 Stat. 919; 16 U.S.C. 1241), established a National Trails System, designated the Appalachian and Pacific Crest Trails as National Scenic Trails and listed 14 additional routes, including the Gold Rush Trails of Alaska, for study as potential National Scenic Trails. The Act also prescribed procedures for establishing additional National Scenic Trails, National Recreation Trails, and connecting and side trails in the System.

The report details the findings and recommendations of the Department's study of seven Alaska Gold Rush Trails. We have concluded that, of the seven, only the Iditarod Trail, as studied and presented in the report, meets the criteria for addition to the National Trails System as a National Historic Trail. Legislation to establish a category of National Historic Trails within the National Trails System was submitted to the Congress following the President's May 1977 Environmental Message.

The Iditarod route from Seward to Nome is composed of a number of trails and side trails developed at different times during the Gold Rush era. These trails, aggregating 2,037 miles, offer a rich diversity of climate, terrain, scenery, wildlife, recreation and historic resources in an environment largely unchanged since the days of the "stampeders." It is the isolated, primitive quality of this historical environment which makes the Iditarod National Historic Trail proposal unique.

Overall coordination of Iditarod National Historic Trail matters would be assigned to the Secretary of the Interior. The Secretary would cooperate with the heads of other Federal agencies, the State, local agencies and private trail interests and historical organizations in planning the development of the trail and its subsequent management.

The components of the trail recommended for initial designation are those segments which lie within the exterior boundaries of federally administered areas. Under the proposed legislation, the Secretary of the Interior may designate lands outside of the exterior boundaries of federally administered areas as segments of the Iditarod National Historic Trail upon application from appropriate State or local governmental agencies or concerned persons or organizations if such segments meet prescribed criteria and when those segments are administered by such agencies or interests without expense to the United States. The use of snowmobiles on segments of the Iditarod National Historic Trail would be permitted in accordance with regulations prescribed by the appropriate Secretary.

In accordance with Section 5(b) of the National Trails System Act (Public Law 90-543) which states, ". . . proposals shall be accompanied by a report, which shall be printed as a House or Senate document . . .", it is respectfully requested that the Iditarod Trail report be printed as a House document.

The Office of Management and Budget has advised that the Iditarod Trail proposal is in accord with the program of the President.

Sincerely,

Bob Herbst
Assistant SECRETARY

Enclosure

best copy available

THE IDITAROD TRAIL
(SEWARD-NOME ROUTE)

AND OTHER
ALASKAN GOLD RUSH TRAILS

Prepared by
Bureau of Outdoor Recreation
Department of the Interior
Under the Authority
of the National Trails System Act.

September 1977

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Introduction

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INTRODUCTION

The National Trails System Act, Public Law 90-543, was approved on October 2, 1968. This Act states:

> In order to provide for the ever-increasing outdoor recreation needs of an expanding population and in order to promote public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas of the Nation, trails should be established (i) primarily, near the urban areas of the Nation, and (ii) secondarily, within established scenic areas more remotely located.

The Act instituted a national system of recreation and scenic trails; designated the Appalachian and Pacific Crest Trails as the initial components of the National Scenic Trail System; and prescribed methods by which, and standards according to which additional components may be added to the system.

The Act directed that 14 specified routes would be studied for the purpose of determining the possibility and desirability of designating each as a national scenic trail. One route named for study was the Gold Rush Trails in Alaska. No further identification of the route was included in the Act. The initial task was, therefore, to determine which specific trails should be studied as the basis of appropriate proposals for additional national scenic trails to be submitted to the President and to the Congress.

An analysis of the legislative history revealed that five gold rush trails were mentioned for consideration in the legislative record of the National Trails System Act. They were: (1) the Chilkoot Trail, extending from Dyea over Chilkoot Pass to the Canadian border; (2) the White Pass Trail, from Skagway to the Canadian border; (3) the Dalton Trail, beginning at Haines and extending along the Chilkat River to the Canadian border; (4) the Valdez Trail, extending from Valdez to Fairbanks; and (5) the Iditarod Trail, originating in Knik and crossing the Alaska Range to Iditarod City. At the end of this list was the additional phrase ". . . and other such Gold Rush Trails in Alaska." It was concluded that the five named routes would be evaluated as well as any other important historic routes related to the Gold Rush Era.

An Alaska Gold Rush Trail Study team was formed in September 1973. It was chaired by the Bureau of Outdoor Recreation and had representatives from the following agencies:

Alaska State Department of Environmental Conservation
Alaska State Department of Highways
Alaska State Department of Fish and Game

Alaska State Division of Parks
Alaska State Historical Commission
Alaska Bi-Centennial Commission
Bureau of Land Management
National Park Service
Fish and Wildlife Service
Federal-State Land Use Planning Commission
U. S. Forest Service
Office of the Governor, Division of Policy
  Development and Planning

The tasks undertaken by the study team were: (1) determine any routes, in addition to those named in the legislative record, believed to have high potential for public enjoyment related to the history of the Gold Rush Era; (2) make a preliminary analysis of the trails named in the legislative record and other trails identified under task (1) to determine which route segments have high potential for public recreation enjoyment by virtue of visible historic remnants, presence of historic sites, high scenic quality, freedom from intrusion, length, accessibility, and other factors; and (3) conduct a detailed study of trails which appear to merit in-depth evaluation in accordance with Section 5(b) of the National Trails System Act.

TRAILS ANALYZED

From the legislative history, the five previously described trails were analyzed. The Iditarod Trail, for analytical purposes, was considered as extending from Seward to Nome, with a spur to Iditarod.

To the original list of five trails were added the Koyukuk-Chandalar Routes, also known as the Fairbanks-Wiseman Trail, and the Washington-Alaska Military Cable and Telegraph System (WAMCATS), also referred to as the Valdez-Eagle-Big Delta Telegraph Line.

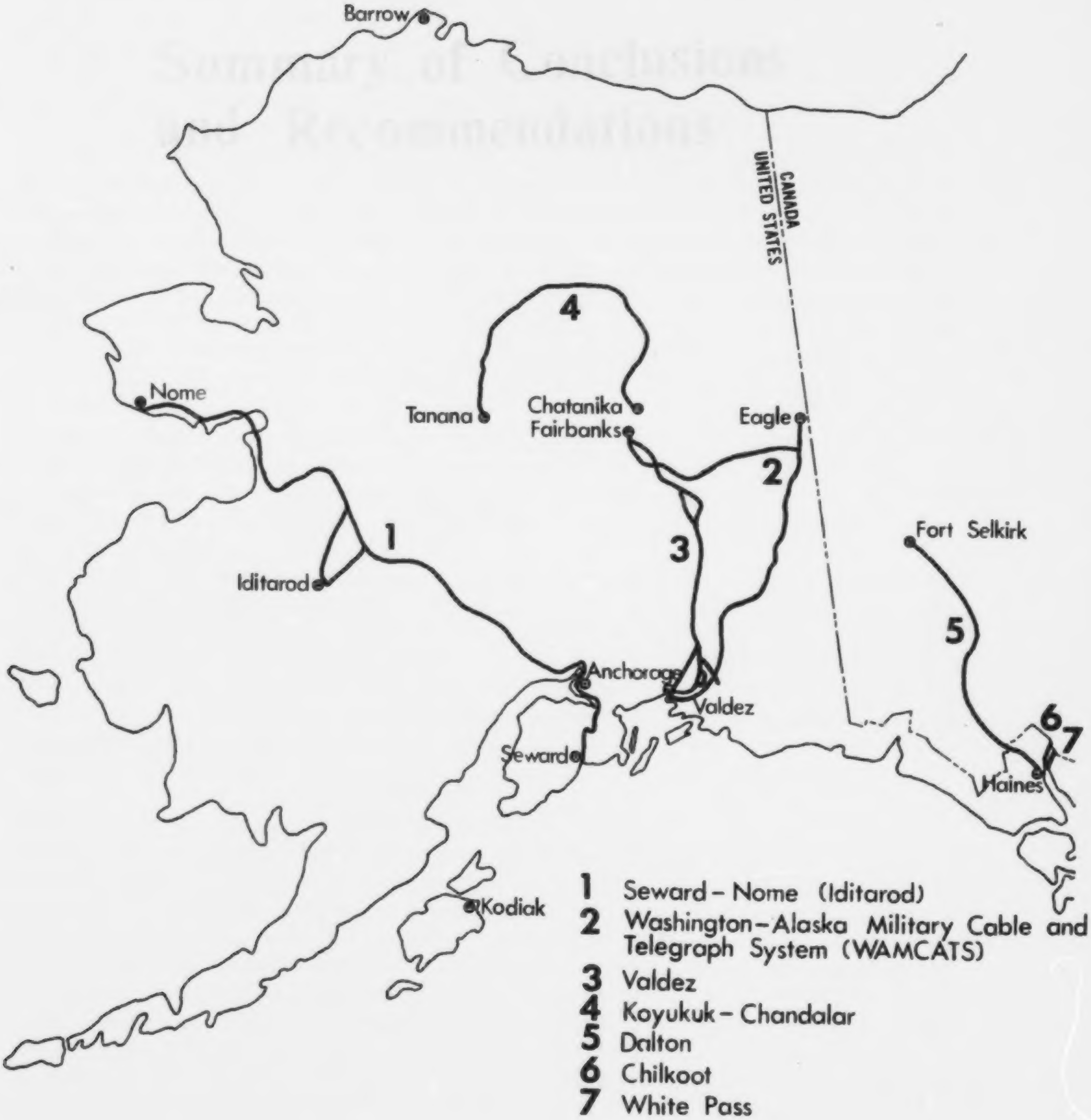
Other trails, such as the Katmai Trails and the White River Trail across Skolai Pass, were considered, but the study team concluded that these lesser gold rush routes did not warrant analysis at this time. It was also determined that major water-based routes, such as the Yukon River, would not be analyzed.

TRAILS MERITING IN-DEPTH STUDY

Of the seven gold rush trails or routes analyzed, four were considered to be of special significance and meriting detailed study and evaluation for possible inclusion in the National Trails System. These were the Iditarod, WAMCATS, Chilkoot, and White Pass Trails. The Iditarod and WAMCATS Trails received detailed evaluation as a part of this study. The Chilkoot and White Pass Trails had been the subject of intensive evaluation by the National Park Service in connection

GOLD RUSH TRAIL SEGMENTS

Evaluated During Study


Barrow
CANADA
UNITED STATES
Nome
Tanana
Chatanika
Fairbanks
Eagle
Iditarod
Fort Selkirk
Anchorage
Valdez
Seward
Haines
Kodiak
1
2
3
4
5
6
7
1 Seward - Nome (Iditarod)
2 Washington-Alaska Military Cable and Telegraph System (WAMCATS)
3 Valdez
4 Koyukuk - Chandalar
5 Dalton
6 Chilkoot
7 White Pass

with recent studies of the then proposed Klondike Gold Rush National Historic Park and further study was considered unnecessary.

Summary of Conclusions and Recommendations

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SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

The study team found important historical and recreational values associated with each of the Alaska Gold Rush study routes. The Seward-Nome (Iditarod) route is proposed for designation as a National Historic Trail and inclusion in the National Trails System. Legislation to amend the National Trails System Act to include the new National Historic Trail category has been proposed.

None of the other trails or routes are recommended for inclusion in the National System at this time.

The Seward-Nome route is composed of a number of trails and side trails developed at different times during the Gold Rush Era. The Iditarod strike began in 1908; it was the last of the major Alaskan strikes and prompted the Alaska Road Commission to improve the Rainy Pass-Kaltag section of the Seward to Nome trail. Because the Iditarod mining district was the most common destination of travelers in this last phase of the Gold Rush Era, the name Iditarod Trail has become a term of convenience to describe the many geographic and historic segments of the Seward to Nome trail. These trails, aggregating 2,037 miles, offer a rich diversity of climate, terrain, scenery, wildlife, recreation, and historic resources in an environment largely unchanged since the days of the stampeders. It is the isolated, primitive quality of this historical environment that makes the Iditarod National Historic Trail proposal unique. No where in the National Trails System is there such an extensive landscape, so demanding of durability and skill during its winter season of travel. On the Iditarod, today's adventurer can duplicate the experience and challenge of yesteryear.

Though comprehensive studies of historic resources remain to be done, preliminary surveys have indicated that the Iditarod Trail possesses national historical significance. Rapid erosion of known historic resources, and impending threats to the primitive quality of the trail, are immediate concerns. Should the Congress act favorably on the Iditarod Trail proposal, comprehensive studies and management programs would be initiated to preserve the trail's historic environment and resources.

The Washington-Alaska Military Cable and Telegraph System (WAMCATS) played an important role in the Gold Rush Era. Portions of the route have been paralleled or overlain by highways. One section of 95 miles between Unalakleet and Kaltag was analyzed as part of the Iditarod Trail. Approximately 376 miles of the line between Eagle and Slana and between Kechumstuk and the Big Delta area offer a wide variety of historic interest and recreation opportunity. The findings, however, are that while possessing significant values, a National Scenic or National Historic Trail designation is not warranted as it was primarily a telegraph line rather than a trail and since it does not have the desired nationwide attraction.

The Valdez Trail has been replaced by highways. Roadside interpretation of its historical aspects is needed at some locations. However, this should properly be a State/local responsibility.

The Koyukuk-Chandalar routes were found not to have been of national significance and do not possess high potential for recreation use or development. In addition, a segment of the route in the Wiseman area is overlain or paralleled by a highway and a pipeline.

The Dalton Trail does not meet the guidelines established for National Scenic Trails. The portion in the United States is paralleled by a road for its entire length and logging roads and mining activities in the area have disrupted major segments of the historic route. It does offer opportunities for short day hikes and interpretation, but this should be a State/local consideration.

The Chilkoot and White Pass Trails are of national significance, but not of sufficient length to be considered for designation as National Scenic Trails. They likely would meet the criteria for designation as National Historic Trails, should the National Trails System Act be amended to include that category. In the meantime, their protection and use for public purposes is assured as a result of the recent authorization of a Klondike Gold Rush National Historic Park which encompasses the United States portions of the two trails.

The Alaska Gold Rush

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THE ALASKA GOLD RUSH

The great Klondike gold strike was not the first gold discovery in the far north, nor were the thousands that poured into Alaska and the Yukon in 1898 the first stampeders into the country.

Discoveries of small amounts of gold were reported as early as the 1830's by Russian explorers and fur traders. In their search for furs and Native trade markets, Russians traveled along Alaska's coast and up several major rivers. The gold found along the Kuskokwim, the Yukon, in the Cook Inlet area, and in southeast Alaska, and perhaps other places during the Russian rule of Alaska, appeared to be of only casual interest to the discoverers. These finds caused no stampedes and apparently did not distract the Russians from their primary bonanza, furs.

In the 1860's, Russian influence and activities in Alaska waned, culminating in the sale of "Seward's Icebox" to the United States in 1867. However, even prior to the sale of Alaska, Americans had begun drifting north. After the California Gold Rush of 1849, many prospectors continued the search for gold up through British Columbia. In 1861, gold was discovered in the Stikine River country of British Columbia. In 1862, Reverend Robert McDonald reported finding gold in the Yukon drainage near the present town of Circle. The site of this discovery was never relocated. In 1865, traces of gold were discovered by Daniel Libbey in the Nome area.

In 1871, gold was discovered in northern British Columbia and at Sitka in southeast Alaska. These strikes attracted several hundred men, but it was not until 1880 that the first major gold strike in Alaska was made. Richard Harris and Joseph Juneau found lode deposits of gold in southeast Alaska near the town named after the latter man. A year later, the famous Treadwell mine was in operation and large-scale production was underway.

The prospecting moved northward into the Yukon Territory and in the early 1880's, gold was found in the Pelly and Stewart Rivers--the first strike in the Yukon drainage. The first stampede into the Yukon River country involved about 200 would-be miners along the Stewart River in 1885-86. Most were already living or prospecting in the region.

The increased activity in the Upper Yukon drainage immediately sparked further discoveries. The first gold discovery in the U. S. portion of the Yukon drainage occurred in 1886 by Howard Franklin on a tributary of the Fortymile River bearing his name. A rush of prospectors to the region ensued and further discoveries were made in the Fortymile district.

Prospectors were also exploring other regions of Alaska at the time. Gold was reported at Tramway Bar in the upper Koyukuk River drainage as early as 1887. The following year, reports of gold came from the

Nome area on the Seward Peninsula and from the Kenai Peninsula along Cook Inlet. In the early 1890's, gold was also found in the Valdez area. These strikes attracted only local interest and no stampedes resulted.

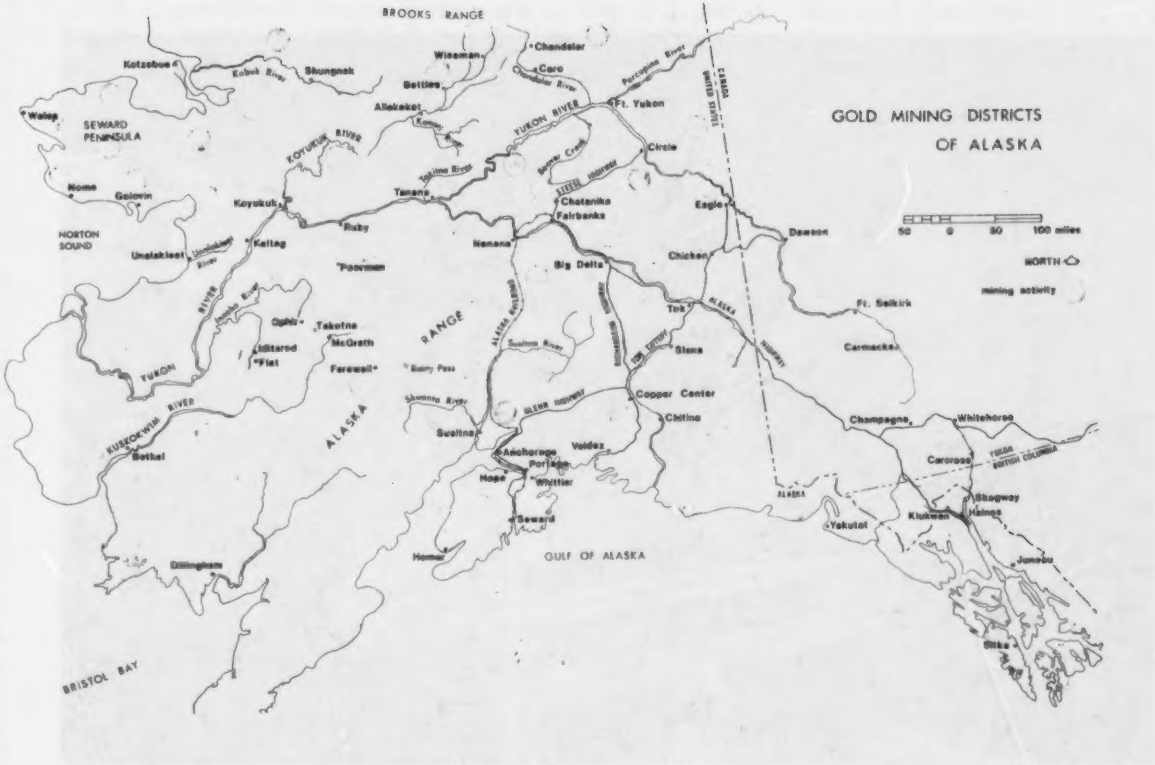
The second major stampede in the United States portion of the Yukon drainage began in 1893. Hundreds of men moved down the Yukon River from diggings along upstream tributaries to the boom town of Circle, located about 165 miles downriver from the United States-Canada border. During the rush of people upriver to the Circle district discoveries, gold was found in the Rampart area. Discoveries of gold on the Kenai Peninsula in 1896 finally attracted attention from outside the region. During that summer, an estimated 2,000 to 2,500 persons steamed into Cook Inlet and Prince William Sound, drawn by reports of gold on the Kenai Peninsula.

On August 14, 1896, Skookum Jim, Tagish Charley, and George Carmack made one of the largest placer gold strikes in history on a small tributary of the Klondike River in the Yukon Territory. In the next few months, many of the estimated 1,700 white men in the Yukon basin, of which 1,000 were in Alaska, rushed to the new strike and staked claims. Boom towns of previous strikes, such as Circle and Fortymile, were nearly deserted as men stampeded back up the Yukon to the Klondike.

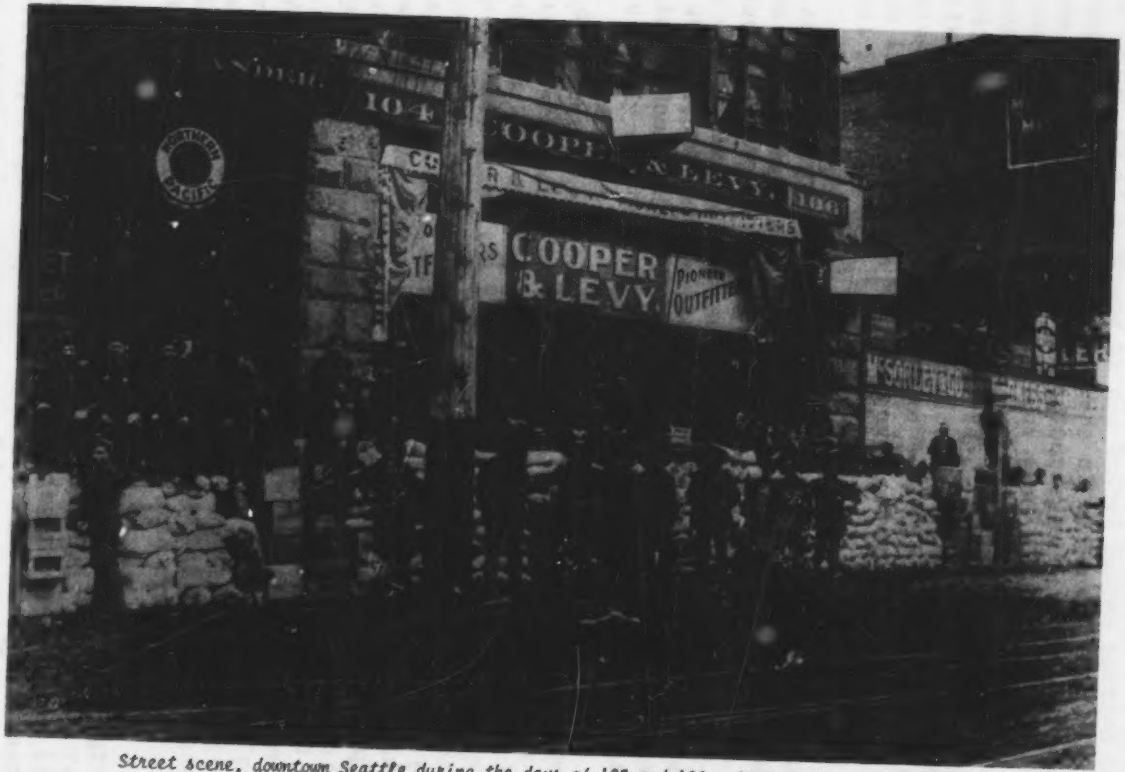
Ships carrying gold from the Klondike arrived in San Francisco and Seattle during July of 1897 and the rush was on. During the fall and winter of 1897 and the spring and summer of 1898, an estimated 60,000 persons headed for the Klondike. Approximately 28,000 landed at Skagway or Dyea in southeast Alaska to attempt either the Chilkoot or White Pass Trails to the Yukon River and then travel down the river to the boom town of Dawson. Another 5,000 landed at Wrangell in southeast Alaska to go up the Stikine River route to the Yukon. Approximately 5,000 to 6,000 took steamers up 1,200 miles of the Yukon River from St. Michaels on the Bering Sea to Dawson. Roughly 4,000 persons landed at Valdez and attempted an overland route across glaciers, raging rivers, marshes, and mountains to Dawson. Others chose routes from such other coastal Alaska areas as Yakutat, the Copper River mouth, and Haines. Still others chose overland routes through Alberta, British Columbia, down the McKenzie River and into the Yukon drainage.

During 1898, some of the stampeders became either discouraged by the large numbers of Klondike gold seekers or distracted by reports of other gold strikes, even before reaching the Yukon gold fields. A reported 1,200 persons sailed north up Alaska's west coast to Kotzebue Sound, urged on by false reports of large strikes on the Kobuk River. Another 7,000 to 10,000 persons arrived in the Cook Inlet region.

By winter in 1898, an estimated 30,000 people were in the Yukon region. Of that number, 13,000 were in the Klondike district. Many of the


GOLD MINING DISTRICTS
OF ALASKA

BROOKS RANGE
Kotzebue
Kobuk River
Shungnak
Wiseman
Bettles
Alleknket
Chandalar
Caro
Chandalar River
Porcupine River
Ft. Yukon
YUKON RIVER
CANADA
UNITED STATES
Wales
SEWARD PENINSULA
Nome
Golovin
NORTON SOUND
KOYUKUK RIVER
Koyukuk
Tozitna River
Tanana
Beaver Creek
STEESE HIGHWAY
Circle
Chatanika
Fairbanks
Ruby
Nenana
Eagle
Dawson
Unalakleet
Unalakleet River
Kaltag
Poorman
Big Delta
Chicken
RIVER
Innoko River
Ophir
Takotna
McGrath
Iditarod
Flat
Farewell
Rainy Pass
RANGE
ALASKA RAILROAD
Susitna River
RICHARDSON HIGHWAY
Tok
ALASKA HIGHWAY
TOK CUTOFF
Slana
YUKON
KUSKOKWIM RIVER
Bethel
ALASKA
Skwentna River
Susitna
GLENN HIGHWAY
Copper Center
Chitina
Anchorage
Valdez
Portage
Hope
Whittier
Seward
Homer
GULF OF ALASKA
Dillingham
BRISTOL BAY
50 0 50 100 miles
NORTH
mining activity
Ft. Selkirk
Carmacks
Champagne
Whitehorse
Carcross
YUKON
BRITISH COLUMBIA
ALASKA
Skagway
Haines
Klukwan
Yakutat
Juneau
Sitka



NORTHERN PACIFIC
104
COOPER & LEVY.
106
COOPER
& LEVY
PIONEER OUTFITTERS

Street scene, downtown Seattle during the days of '97 and '98. (University of Washington)

30,000 never reached their goal, and many left shortly after arriving, finding no gold or even unclaimed ground on which to stake and work.

About the same time gold was found in the Klondike, another discovery was made on the Seward Peninsula of Alaska. First reports of the strike were either doubted or ignored by stampeders with Klondike fever. But by September of 1898, people were convinced that another Klondike had been found. Just as at Fortymile and Circle, thousands deserted Dawson and existing diggings and headed for Nome hoping for a second chance to strike it rich. During the next few years, the creeks around Nome and then the Nome beaches constituted Alaska's greatest gold producing area.

The census of 1900 found 63,592 persons residing in Alaska. This was double the figure of 1890. The Native population, 30,000, remained basically unchanged over the decade. Thus, the gold rush was largely responsible for attracting about 30,000 new residents to Alaska by 1900. However, Alaska's greatest gold discovery was yet to occur.

Felix Pedro, in his travels to the Circle mining district in 1899, found gold in what was to be the Fairbanks area. He never rediscovered this site, but on July 22, 1902, Pedro once more struck gold in the same area. Again, the rush was on, and thousands came from the Klondike, from Nome, from the many other smaller districts, and from outside. By 1905, the Fairbanks district topped all others in Alaskan gold production.

And still there were more strikes. In 1906, gold was discovered in the upper Innoko drainage. That same year, the Chandalar strike brought hundreds of men into the Brooks Range. A year later, the sporadic mining in the upper Koyukuk drainage was greatly stimulated by a new strike in the Wiseman area. In 1908, the last major Alaskan gold strike occurred in the upper Iditarod drainage. Like so many times before, thousands abandoned meager diggings elsewhere, quit laboring jobs in boom towns, or caught steamers north to Alaska in search of that one big strike.

Most mining districts reached peak production within 4 or 5 years of discovery. Soon after discovery, most streams and other potential areas for gold were staked out, and most stampeders either left dejected or found work in other miners' operations or in nearby boom towns. However, even after the rush was over and most of the easily mined gold taken out, small numbers of miners hung on, making meager to modest incomes.

The use of hydraulic mining machinery after about 1912 sharply reduced the need for large numbers of laborers in the gold fields. This development accelerated the abandonment of already declining boom towns and mining districts. World War I marked the end of mining in most remaining districts and the end of the Gold Rush Era for all practical purposes as labor was drawn off by the war effort and by construction of the Alaska Railroad.

The greatest production of gold in Alaska was reached in 1906. That year, Alaska was the second largest producer in the nation behind Colorado. Together, the two states accounted for one-half the gold production of the United States. In overall gold production to date, Alaska ranks fourth behind California, Colorado, and South Dakota. Among the hundreds of individual mining districts, the Fairbanks district ranks seventh nationally in total gold production, Juneau ranks eighth, and Nome ranks thirteenth.

Most of the gold produced in Alaska and the Yukon came from placer-type operations in the following areas:

Cook Inlet-Susitna
Copper River
Kenai Peninsula
Kuskokwim River
Seward Peninsula
Yukon River

Probably the richest areas were Fairbanks in the Yukon River area and Nome in the Seward Peninsula area. The Iditarod Trail passes through the Yukon River area after leaving Kaltag. Gold lode mines were also active in southeast Alaska and in the Fairbanks area. Probably the most noted mines were the Treadwell mines on Douglas Island and the Alaska-Juneau mine near Juneau.

Placer or alluvial deposits are accumulations of unattached particles of metals or minerals in erosional debris remaining after destruction of their host rock. These deposits occupy beds of ancient rivers or valleys and have been washed down from some vein or lode. The term lode applies to any zone or belt of mineralized rock lying within boundaries clearly separating it from the neighboring rock. Lode deposits are mined by underground methods and workings are reached by either vertical or inclined shafts or by adits. Placer deposits are worked by dredging, hydraulicking, sluicing, or by panning. Frozen bench gravels and stream valley deposits in the Yukon and in Alaska were drift mined. These deposits were covered by a thick layer of frozen overburden and shafts were sunk to bedrock to recover the gold values. The miners thawed the paystreak with fire and hauled the gravel to the surface where they processed it through sluice boxes to recover the gold. This very tedious process was used extensively in the Nome area during the gold rush days. Placer deposits could be worked with little or no capital expense and the individual prospector did not have to transport heavy machinery or mining equipment over great distances. The large dredges and the lode or underground miner followed the placer miner in many instances. The prospector and the small placer miner are perhaps the major factor in the settlement of what used to be the great territory of Alaska.

In terms of individual placer districts, the Fairbanks strike proved to be the most productive placer gold district in the United States with 7.2 million ounces of gold produced. Nome with 3.5 million ounces also ranks among the leading placer districts. However, in comparison, Canada's Klondike district tops all in North America with 11 million ounces produced.

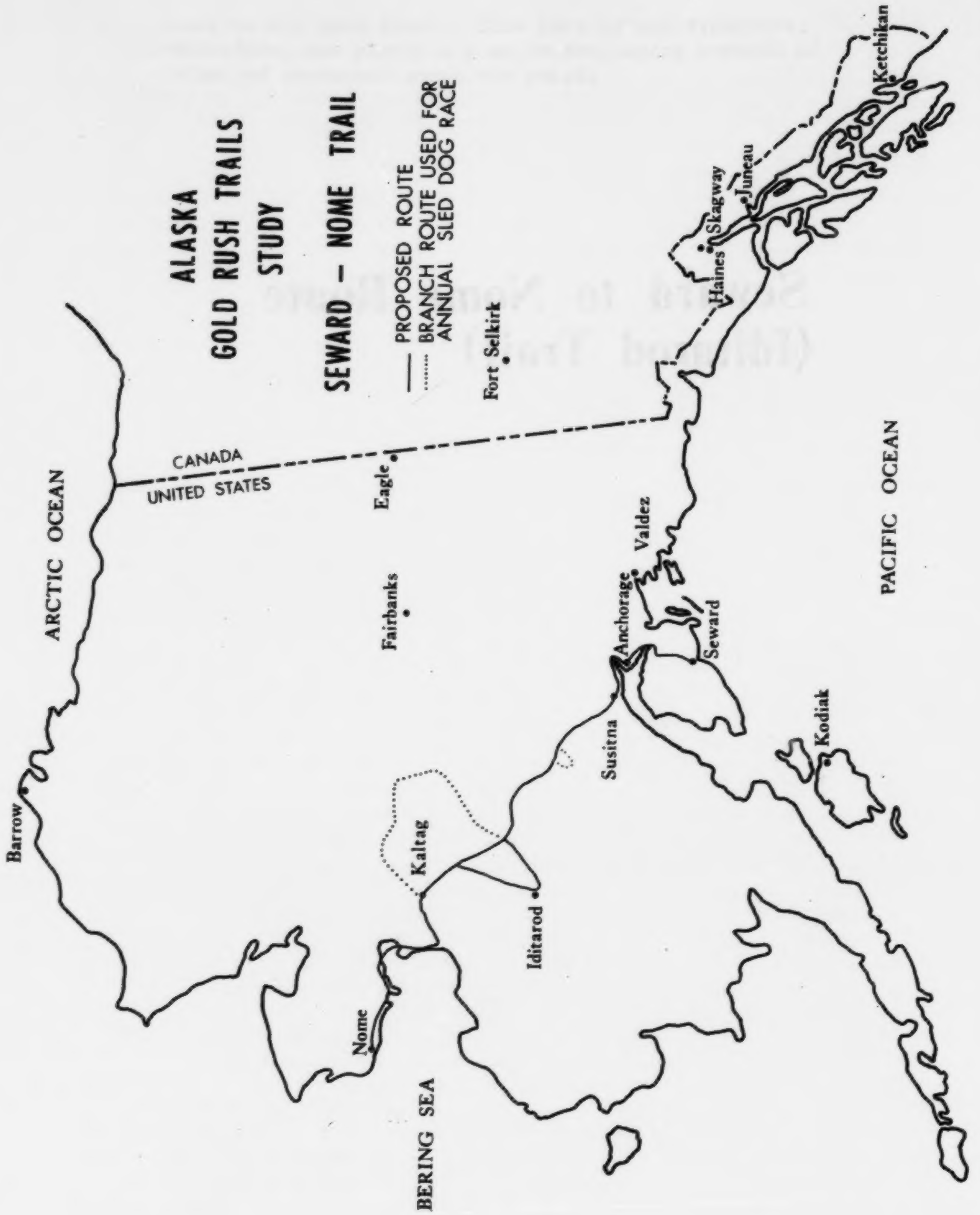
The Alaska-Yukon gold rush was of more importance than just the numbers of people involved and the amount of gold produced. Like the California Rush of 1849, the stampede to Alaska and the Yukon formed a chapter of the Nation's history and the cultural heritage of the hundreds of thousands of persons now residing in Alaska, the Yukon, and in the Puget Sound area of Washington State. Alfred Brooks, the head of the United States Geological Survey work in Alaska during the gold rush period, perhaps best summarizes the gold rush impact in his book, Blazing Alaska's Trails:

"The Klondike Gold"

> The educational value of the movement to the Klondike has been more than a minor factor in the building of the nation. Our great northwest territory became known to the nation; and while the exaggerated statements about the hardships and perils as well as the harshness of the climate at first broadcast many untruths, yet at least Americans learned that there was such a place as Alaska. Moreover, thousands reached the West Coast, who except for the lure of gold would never have seen the Pacific; a better knowledge of our great West and its people was thus broadcast. These were the broadening influences that affected to greater or less extent the whole people. In addition, there was the influence of half a hundred thousand who actually reached the shores of Alaska and, in some cases, even its great interior. The large part of them had come from a sheltered life and thus by actual contact came to know frontier life, that life which has been such a strong influence in moulding American character by developing initiative and self-reliance. Many a man from the farm, desk, or workshop came to know for the first time what it meant to be thrown entirely on his own resources. Life on the Klondike Trail was a great winnowing process. A man stood on his own feet. If he had the basal character, he won; if not, he became a derelict. A small percentage failed through lack of moral stamina, for there was ample opportunity to go to the dogs in the northern gold camps. On the other hand, many a man who had not developed beyond mediocrity in his own community, tightly bound by tradition and custom, found in Alaska his opportunity and

rose to his true level. This last of our frontiers, therefore, has played a part in developing breadth of view and character among our people.

Seward to Nome Route (Iditarod Trail)



ALASKA
GOLD RUSH TRAILS
STUDY

SEWARD – NOME TRAIL

— PROPOSED ROUTE
...... BRANCH ROUTE USED FOR ANNUAL SLED DOG RACE
ARCTIC OCEAN
CANADA
UNITED STATES
Barrow
Fairbanks
Eagle
Fort Selkirk
Kaltag
Iditarod
Nome
BERING SEA
Susitna
Anchorage
Valdez
Seward
Kodiak
Haines
Skagway
Juneau
Ketchikan
PACIFIC OCEAN

SEWARD-NOME ROUTE (IDITAROD TRAIL)

BACKGROUND

The Seward-Nome Route is composed of trails resulting from several gold strikes occurring in different areas at different times. Although popularly known as the Iditarod Trail, only a portion of the Seward to Nome route was constructed and used to reach the Iditarod gold fields.

This route can be best discussed in three segments: Seward to Susitna; Susitna to Kaltag; and Kaltag to Nome.

Seward-Susitna

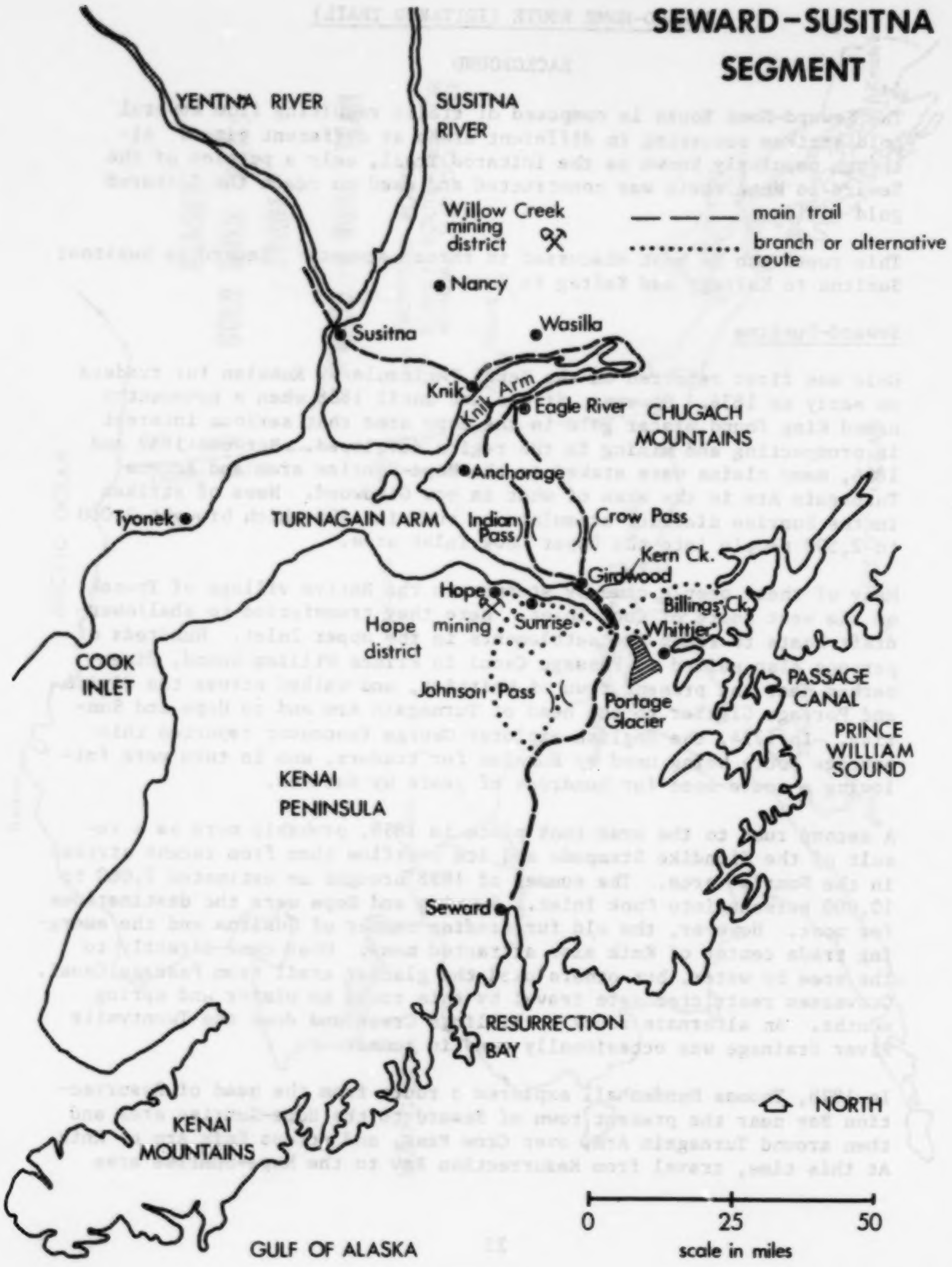
Gold was first reported on the Kenai Peninsula by Russian fur traders as early as 1834. However, it was not until 1888 when a prospector named King found placer gold in the Hope area that serious interest in prospecting and mining in the region developed. Between 1888 and 1896, many claims were staked in the Hope-Sunrise area and across Turnagain Arm in the area of what is now Girdwood. News of strikes in the Sunrise district stimulated a rush in 1896 which brought 2,000 to 2,500 people into the Upper Cook Inlet area.

Many of these people came by steamer to the Native village of Tyonek on the west shore of Cook Inlet. Here they transferred to shallower-draft boats to reach the settlements in the upper Inlet. Hundreds of persons also sailed to Passage Canal in Prince William Sound, disembarked near the present town of Whittier, and walked across the divide and Portage Glacier to the head of Turnagain Arm and to Hope and Sunrise. In 1794, the English explorer George Vancouver reported this portage route being used by Russian fur traders, who in turn were following a route used for hundreds of years by Natives.

A second rush to the area took place in 1898, probably more as a result of the Klondike Stampede and its overflow than from recent strikes in the Sunrise area. The summer of 1898 brought an estimated 7,000 to 10,000 persons into Cook Inlet. Sunrise and Hope were the destinations for most. However, the old fur trading center of Susitna and the emerging trade center of Knik also attracted many. Most came directly to the area by water, but others used the glacier trail from Passage Canal. Crevasses restricted safe travel by this route to winter and spring months. An alternate route on Billings Creek and down the Twentymile River drainage was occasionally used in summer.

In 1898, Thomas Mendenhall explored a route from the head of Resurrection Bay near the present town of Seward to the Hope-Sunrise area and then around Turnagain Arm, over Crow Pass, and across Knik Arm to Knik. At this time, travel from Resurrection Bay to the Hope-Sunrise area

SEWARD–SUSITNA SEGMENT


YENTNA RIVER
SUSITNA RIVER
Willow Creek mining district
— — — main trail
.... branch or alternative route
Nancy
Susitna
Wasilla
Knik
Knik Arm
Eagle River
CHUGACH MOUNTAINS
Anchorage
Tyonek
TURNAGAIN ARM
Indian Pass
Crow Pass
Kern Ck.
Girdwood
Hope
Billings Ck.
Hope mining district
Sunrise
Whittier
COOK INLET
PASSAGE CANAL
Johnson Pass
Portage Glacier
PRINCE WILLIAM SOUND
KENAI PENINSULA
Seward
RESURRECTION BAY
NORTH
KENAI MOUNTAINS
0
25
50
scale in miles
GULF OF ALASKA

and over Crow Pass had been undertaken occasionally by prospectors, but no real trails existed.

A trail from Prince William Sound to Turnagain Arm was used aboriginally by the Tanaina Indians and Chugachmiut Eskimos. Natives living in the Upper Inlet area of the Cook Inlet Region still tell stories of how the Chugach used the trail in order to wage battles against the Tanaina.

Cook Inlet was normally not navigable during the winter months. Susitna, Knik, Sunrise, and Hope were dependent on winter mail and supplies coming from the ice-free landing sites in Passage Canal and Resurrection Bay. With the growing population in the upper Inlet and with the desire to maintain communications and supply lines, a system of trails soon developed.

By 1900, crude winter trails for pack horses and dog teams were developed between Resurrection Bay and the Sunrise area and between Sunrise and Knik and Susitna. In 1902, the first regularly scheduled mail contract was let for service between Resurrection Bay and Sunrise and Hope.

After the strikes of 1902 in the Yentna River District and of 1906 in the Willow Creek District, winter trails from Seward to Susitna were well established, providing transportation for mail, supplies, and travelers.

Between 1904 and 1906, approximately 50 miles of the Alaska Central Railroad were constructed from Seward toward Turnagain Arm. By 1909, the railroad, then under the name of the Alaska Northern Railroad, had been completed around the eastern end of Turnagain Arm to mile 71 at Kern Creek.

Susitna-Kaltag

Travel into the upper Kuskokwim and Innoko River country before 1905 was limited to a few Russian explorers in the 1830's and 1840's, to several USCS and military exploration parties at the turn of the century, and to occasional prospectors.

In the summer of 1906, a prospecting party led by Thomas Ganes crossed from the Kuskokwim River into the upper Innoko drainage and struck gold on Ganes Creek. That winter, news of the strike caused a stampede by miners, mostly from along the Yukon River. These early prospectors crossed overland from Kaltag and from the trading post of Lewis Landing on the Yukon. When navigation opened that summer, 800 to 900 people came down the Yukon from Fairbanks and up the Innoko to the Indian settlement of Dishkaket. Several hundred persons also sailed from Nome up the Yukon and Innoko. From Dishkaket, people lined or poled upriver to Ganes Creek.

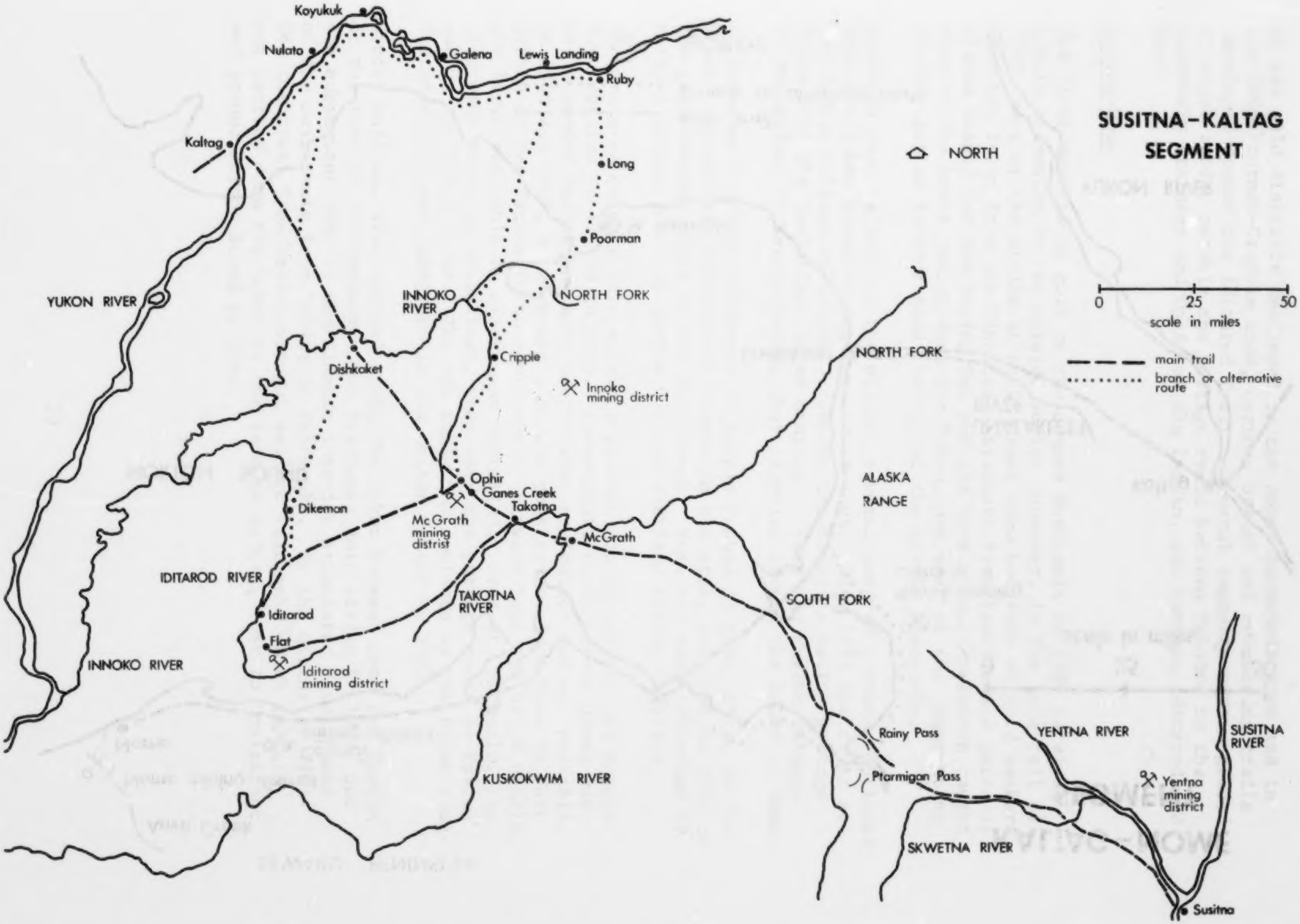
During the winter of 1907-08, men and supplies were transported overland from Kaltag and Lewis Landing by dog team to the town of Moore City on Ganes Creek. A strike on nearby Ophir Creek in early 1908, left Moore City deserted, and the new town of Ophir sprang up.

In 1908, W. L. Goodwin of the Alaska Road Commission surveyed a new trail from Seward to Nome. This trail was to provide more direct winter transportation to Nome and at the same time provide overland access to the new strikes in the Innoko district. Goodwin completed his survey utilizing existing routes from the end of the Alaska Central Railroad at about mile 54, around Turnagain Arm, over Crow Pass, and around Knik Arm, to Knik and Susitna, and also from Kaltag over the divide to Unalakleet and around Norton Sound to Nome. Persons were reported traveling from Susitna to Ophir during the late winter of 1908 and the winter of 1908-09, utilizing river ice corridors adjacent to Goodwin's survey route.

W. A. Dikeman and John Beaton descended the Innoko in late summer of 1908 and went up one of its major tributaries, the Haiditarod, or as it later became known, the Iditarod. On Christmas Day 1908, they reportedly struck gold on Otter Creek. News of the Iditarod strike was slow to spread, and the summer of 1909 attracted only several hundred persons into the area, mainly from the Innoko district and from along the Yukon River. Little mining occurred that summer because of poor transportation and a lack of equipment and supplies, but considerable claim staking took place. During the winter of 1909-10, reports of rich strikes were widespread. Approximately 2,000 people traveled the Yukon, Innoko, and Iditarod Rivers when navigation opened in the summer of 1910. In all, an estimated 2,500 people stampeded to the Iditarod goldfield, resulting in the new towns of Dikeman at the low water head of steamer navigation, Iditarod at the extreme head of navigation, and Flat, Otter, Bowlder (Boulder), and Discovery.

The Iditarod strike and production of gold in 1910 helped prompt the Alaska Road Commission to begin work on the Seward to Nome trail which had been surveyed by Goodwin in 1908. During the winter of 1910-11, nearly 1,000 miles of trail were marked and cleared from Nome to the Alaska Northern railhead at Kern Creek, 71 miles north of Seward. Although most of the new trail work occurred between the present site of McGrath and Susitna, considerable work was accomplished in marking and repairing the existing routes between Kern Creek and Susitna, between Kaltag and Nome, between Kaltag and the Ophir area, and the branch routes to Iditarod and Flat.

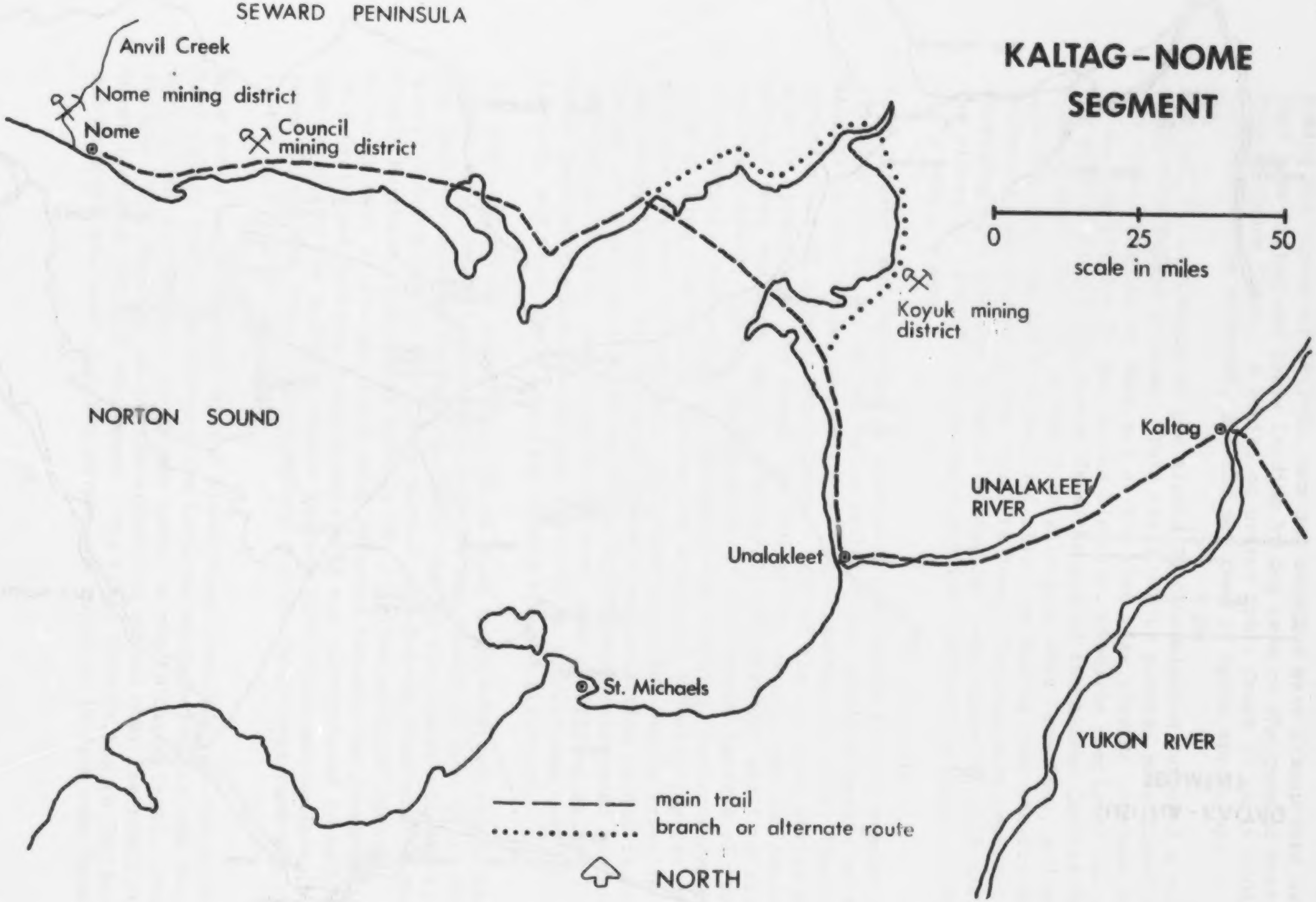
This route was authorized by the Alaska Road Commission as the Rainy Pass-Kaltag Trail, but because the Iditarod mining district was the most common destination, it became known as the Iditarod Trail. From 1911 to 1925, hundreds of people walked and mushed over the trail between Iditarod and Knik or Seward. The trail from Kaltag to Iditarod and to Ophir was used to bring people and supplies in from the Yukon.



SUSITNA - KALTAG SEGMENT

NORTH
0
25
50
scale in miles
main trail
branch or alternative route
Koyukuk
Nulato
Galena
Lewis Landing
Ruby
Kaltag
Long
Poorman
YUKON RIVER
INNOKO RIVER
NORTH FORK
Cripple
Dishkaket
Innoko mining district
NORTH FORK
ALASKA RANGE
Ophir
Ganes Creek
Takotna
McGrath
Dikeman
McGrath mining distrist
IDITAROD RIVER
Iditarod
Flat
Iditarod mining district
TAKOTNA RIVER
SOUTH FORK
INNOKO RIVER
KUSKOKWIM RIVER
Rainy Pass
Ptarmigan Pass
YENTNA RIVER
SUSITNA RIVER
Yentna mining district
SKWETNA RIVER
Susitna

KALTAG-NOME SEGMENT



SEWARD PENINSULA
Anvil Creek
Nome mining district
Nome
Council mining district
Koyuk mining district
0
25
50
scale in miles
NORTON SOUND
Kaltag
UNALAKLEET RIVER
Unalakleet
St. Michaels
YUKON RIVER
main trail
branch or alternate route
NORTH

As new gold districts developed in the upper Kuskokwim area and in the Long-Poorman-Cripple area, various branch and connecting trails developed around the Iditarod Trail. Several segments were upgraded to wagon roads, notably the portage route between Takotna in the Kuskokwim drainage and Ophir on the Innoko, and between Iditarod and Flat.

Kaltag-Nome

The first reports of gold on the Seward Peninsula in 1888 received little attention by the outside world. However, in the late fall of 1898, news of the strike at Anvil Creek drew hundreds of gold seekers down the Yukon from the Klondike. Steamers from Seattle and parts of Alaska headed for the Bering Sea and the Nome area. Freeze-up caught most of the boats coming down the Yukon, and most of the ocean-going vessels got no farther than the tip of the Alaska Peninsula.

Although most waited out the winter, several hundred persons continued down the Yukon River by dog team or on foot. They left the river at the Indian village of Kaltag, crossing the historic Native portage route into the Unalakleet River drainage. From the Eskimo village of Unalakleet on Norton Sound, they traveled around the Sound to Nome.

In the next 2 years, thousands of people rushed to Nome, first to the placer deposits in the several creeks in the area, and then in 1900 to the gold-bearing sands of the Nome beach. Nome was easily reached by steamer during ice-free months with no overland travel required.

As Nome grew quickly into Alaska's richest mining region, its population swelled to 12,500 in 1900. Communication with other areas was badly needed during the many months when navigation was not possible. In 1900 and 1901, a telegraph line was constructed from Nome to Fort Gibbon at the Tanana-Yukon confluence. Between Nome and St. Michaels, the first sea cable in Alaska was installed. From St. Michaels, the line went north to Unalakleet, then over the portage route to Kaltag and up the Yukon River. The sea cable was replaced by the first long-distance wireless telegraph in the United States by 1903.

Winter mail was also carried along the Yukon between Nome and Dawson at the turn of the century. The Fairbanks gold strike in 1902, and the subsequent rush to the Alaskan interior stimulated development of the mail route from Valdez to Fairbanks. By the winter of 1905-06, the trail from Valdez brought mail to Fairbanks which in turn was carried down the Yukon by dog team to Kaltag, over to Unalakleet, and around Norton Sound to Nome.

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LOCATION AND REGIONAL ENVIRONMENT

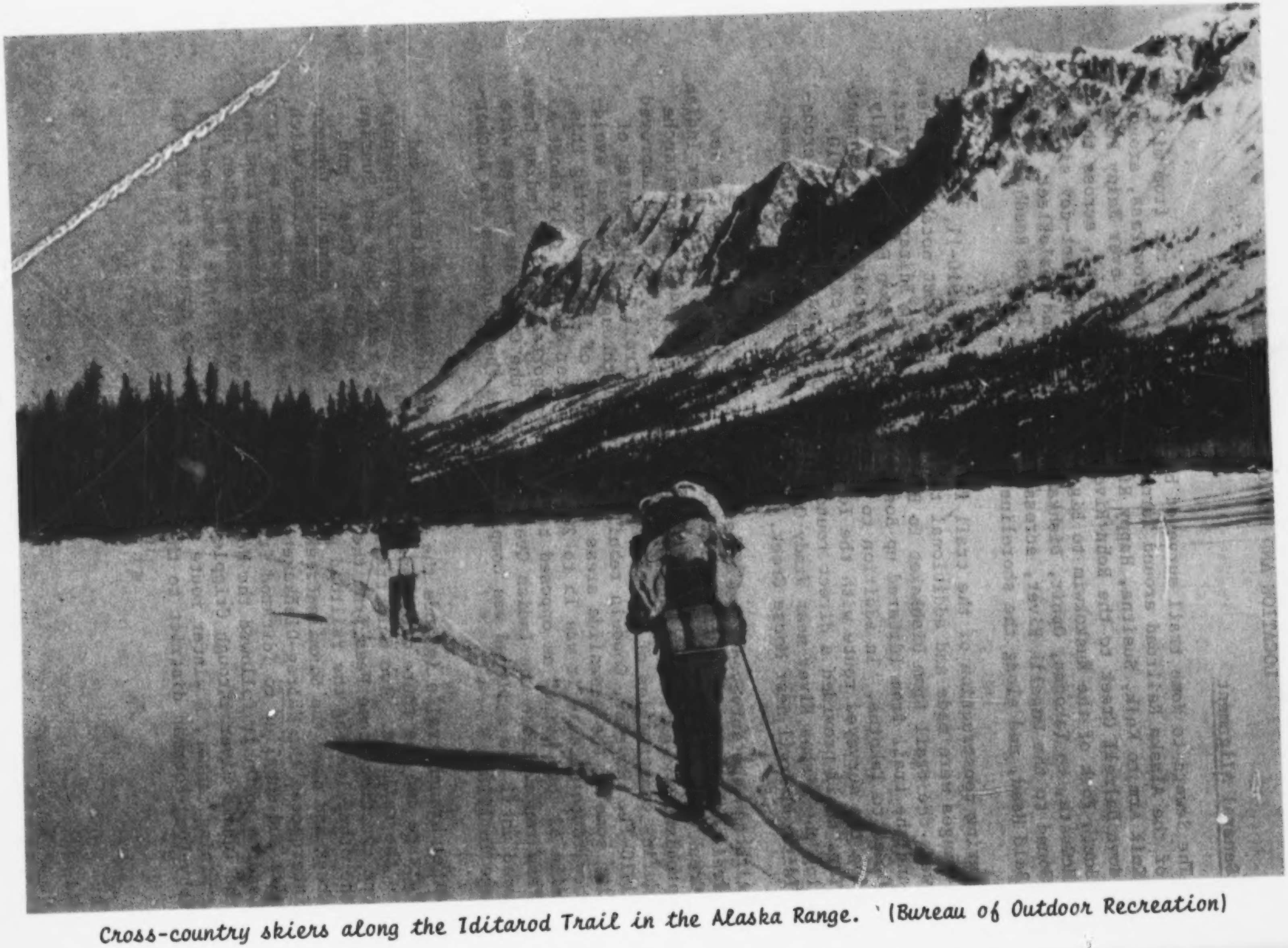
General Alignment

The Seward to Nome trail surveyed by Goodwin in 1908 ran from mile 54 of the Alaska Railroad around Turnagain Arm, over Crow Pass, around Knik Arm to Knik, Susitna, Happy River, Pass Creek, over Rainy Pass, down Dalzell Creek to the Rohn River (or Tatina River), across the South Fork of the Kuskokwim to Big River, to the present-day site of McGrath, to Takotna, Ophir, Dishkaket, Kaltag, and Unalakleet, up Norton Sound to the Ungalik River, across the Sound to Isaacs Roadhouse on Bald Head, and along the shoreline to Nome.

During construction of the trail in the winter of 1910-11, some route changes were made and additional trails marked. Most notable of these were the trail from Dishkaket to Dikeman and on to Iditarod and Flat, and the trail from Iditarod up Bonanza Creek and down Fourth of July Creek to Takotna. In addition to these routes, a third trail connecting the surveyed route with the Iditarod district existed in 1910. This trail provided a direct route between Ophir and Iditarod, crossing the Dishna River near Windy Creek, and intersecting the Dikeman-Iditarod Trail near Moose Creek.

Although the surveyed route crossed Crow Pass from Girdwood, a new trail was constructed from Girdwood down Turnagain Arm and over Indian Creek Pass in the fall of 1908. As this route avoided the avalanche problems and extreme steepness of Crow Pass, it was used and improved during construction of the Kaltag-Rainy Pass Trail in the winter of 1910-11. However, Goodwin rebuilt the trail through Crow Pass avoiding some of the snowslide areas in the summer of 1911, favoring this new route because it was 15 to 20 miles shorter and had only about a mile of "bad going" as opposed to 5 miles reported for the Indian Creek Pass route. Both the Indian Creek Pass and the Crow Pass routes were used until the railroad was completed around the mountains via Anchorage in 1918.

Other branch trails include the glacier route between Whittier and Portage and the route from Passage Canal down the Twentymile drainage to the railroad. Two main trails were used to reach Hope and Sunrise, one crossing Moose Pass from the railroad and up Quartz Creek, and the other leaving the railroad grade at Trail Creek, going up Johnson Creek and down the Sixmile Creek drainage. A trail from Nulato which intersected the Kaltag-Dishkaket trail was used as a shortcut to carry mail and supplies to Iditarod from Fairbanks. The old route from Lewis Landing to Ophir followed the North Fork down to the Innoko, then up the Innoko River through Cripple to Ophir. When Cripple developed as a mining center, a winter route was established to connect it with the Ruby-Long-Poorman district to the east.



Cross-country skiers along the Iditarod Trail in the Alaska Range. (Bureau of Outdoor Recreation)

In the early twenties, summer trails were constructed linking Ophir with Poorman and Ruby, and linking Flat with Takotna. When the Alaska Railroad was completed to Nancy, a new winter trail was built from there to Susitna.

Since March of 1973, a sled dog race from Anchorage to Nome has been held annually. Because this race is billed as the Iditarod Trail Race, the race route is also shown on the accompanying topographic maps (pages 72 through 81). This route varies substantially from the old Rainy Pass-Kaltag Trail in the vicinity of the Alaska Range and between Ophir and Kaltag. The route goes through Ptarmigan Pass rather than Rainy Pass to avoid avalanche danger. In order to touch Native villages along the Yukon, the route follows the newer summer trail out of Ophir through Bear Creek and Folger to Poorman, over the road to Ruby, and down the Yukon through Galena, Koyukuk, and Nulato to Kaltag.

In many areas, the race route crosses sea and lake ice, rivers, and open tundra areas. Here, no trail as such exists, but rather tripods or stakes are used to mark the route. Most of these have to be replaced every year and trail alignments vary by as much as a mile or more from year to year.

Length

Table I gives the approximate mileage of the various historic trail segments, including the present sled dog race route, which total 2,037 miles.

The originally surveyed Rainy Pass-Kaltag Trail which bypassed the Iditarod-Flat area was 914 miles in length from Seward to Nome. The loop to Iditarod was 185 miles in length. The sum of the other historically used branch segments is 938 miles. The sled dog race route from Anchorage to Nome is reported to be 1,049 miles long.

Climate

The National Weather Service describes the climatic zone covering much of the Seward to Nome route as transitional. This zone is characterized by 12 to 30 inches of precipitation annually (average 17 inches) and mean annual temperatures from 22°F to 35°F (90°F maximum; -70°F minimum). Around the McGrath area, a more continental climate is encountered with somewhat colder winter temperatures, warmer summer temperatures, and less precipitation than those regions receiving more maritime influences. In the Seward area, a maritime climatic zone exists. Here precipitation is considerably greater (80 inches), and winter temperatures less extreme.

Over much of the route, winters are long, dark, and severe, beginning with the freeze-up of lakes and streams in October and ending with break-up, usually in May. Snowfall averages 50 to 100 inches a year

TABLE I. Mileages and General Land Status of Trail Segments: Seward to Nome Route (Does not include potential public easements)

Main Route

SEGMENT	MILES	LAND STATUS (in miles)
Seward - Girdwood	75	75 mi. Alaska Railroad (U.S.)
Girdwood - Eagle River (via Indian Creek Pass) (via Crow Pass)	 38 44	40 mi. Chugach State Park 7 mi. Chugach National Forest 29 mi. State highways, roads 5 mi. U. S. Army Reservation 1 mi. private
Eagle - Knik*	55	35 mi. State highways, roads 20 mi. State tidelands
Knik - Susitna*	38	21.5 mi. State 1.5 mi. private 15.0 mi. Mat-Su Borough
Susitna - Old Skwentna (via Alexander Lake)	38	Virtually all in State ownership (some may be transferred to Mat-Su Borough)
Old Skwentna - Rainy Pass Lodge*	52	Virtually all in State ownership
Rainy Pass Lodge - Farewell	52	Virtually all selected for ownership by State
Farewell - McGrath*	80	Approx. 65 mi. proposed for inclusion in Yukon-Kuskokwim National Forest; 15 mi. withdrawn for selection by Native corporations
McGrath - Takotna*	17	Virtually all withdrawn for selection by Native corporations
Takotna - Ophir*	24	Virtually all overlain by State-owned road through Native and State selected lands
Takotna - Iditarod - Ophir Loop*	185	170 mi. selected by State 15 mi. withdrawn for Native selection

Ophir - Dishkaket	55	Approx. 30 mi. through State selected lands; 25 mi. proposed for inclusion in Koyukuk Nat'l Wildlife Refuge
Dishkaket - Kaltag	66	Approx. 15 mi. withdrawn for Native selection; 15 mi. on (d)(1) lands (BLM); 36 mi. proposed for Koyukuk National Wildlife Refuge
Kaltag - Unalakleet*	96	41 mi. withdrawn for Native selection; 50 mi. proposed for Unalakleet National Wild River (BLM); 5 mi. in (d)(1) lands (BLM)
Unalakleet - Solomon*	152	Virtually all withdrawn for Native selection
Solomon - Nome*	32	Overlain by State highway through Native selected lands
SUBTOTAL - Main Route	1,099	

Other Branch Segments

Moose Pass - Sunrise (via Summit Lake)	44	34 mi. overlain by State highway; 10 mi. Chugach National Forest
Moose Pass - Granite Creek Guard Station (via Johnson Pass)	22	Chugach National Forest
Granite Creek Guard Station - Canyon Creek	8	Overlain by State highway
Sunrise - Hope	8	Overlain by State highway
Whittier - Portage		
(via Portage Lake)	17	10 mi. Chugach National Forest 7 mi. overlain by State highway
(via Twentymile)	25	Chugach National Forest
Anchorage - Fort Richardson*	12	4 mi. Anchorage Municipality 8 mi. U.S. Army reservation
Susitna - Nancy	22	15 mi. State patented land 7 mi. Mat-Su Borough land

Susitna - Old Skwentna (via Skwentna Airfield)*	50	State patented land
Rainy Pass Lodge - Rohn (Tatina) River (via Ptarmigan Pass)*	75	State patented land
Farewell Lake - Bear Creek (via Fairwell FAA Airfield)*	26	State patented land
Ganes Creek - Flat (summer trail)	72	State patented land
American Creek - Cripple Landing	26	State selected land
Cripple Landing - Lewis Landing	60	45 mi. State selected land 15 mi. (d)(1) land (BLM)
Cripple - Folger	12	State selected land
Dishkaket - Moose Creek (via Dikeman)	67	20 mi. (d)(2) (proposed Nat'l Wildlife Refuge-FWS); 47 mi. State selected land
Magitchlie Creek - Nulato	52	45 mi. Native selection 7 mi. State selected land
Ophir - Folger*	40	State selected land
Folger - Poorman*	53	State selected land
Poorman - Ruby*	58	Overlain by State highway
Ruby - Lewis Landing*	15	Yukon River (Statehood claim)
Lewis Landing - Galena*	36	Yukon River (Statehood claim)
Galena - Nulato*	52	Yukon River (Statehood claim)
Nulato - Kaltag*	40	Yukon River (Statehood claim)
Golovin - Topkok (via White Mountain)*	36	Native selected land
SUBTOTAL - Other Branch Segments	938	
TOTAL	2,037	

*Segments utilized all or in part in the Annual Iditarod Trail Race.

with accumulations averaging 2 to 5 feet, depending on elevation and wind conditions. Winds along Norton Sound and in the mountainous regions are common and can bring chill factors in the winter down to -100°F and colder. Extended periods of -40°F to -60°F are common in the interior. On the shortest day of the year, only about 2 to 6 hours of daylight occur along the trail route.

Summers are short but warm over most of the route with temperatures often in the 70's and 80's in the interior. On the longest day, sunlight averages from 20 to 22 hours with twilight during the remaining 2 to 4 hours. Precipitation averages 4 to 6 inches during the summer months. Although freezing temperatures have been reported in all months except July in most areas, a frost-free season generally extends from the first of June to the end of August.

Permafrost underlies much of the route, especially north of the Kuskokwim River. The Innoko and Kuskokwim Valleys are underlain with isolated masses of permafrost. Permafrost throughout the Alaska Range is discontinuous. The region from Seward to Susitna is generally free of permafrost.

Topography

Topography varies from the tidewater lagoons, spits, and barrier beaches of the Seward Peninsula, to the high rugged peaks of the Alaska Range and Chugach Mountains. From Seward to Knik Arm, the route traverses narrow valleys through the Kenai and Chugach Mountains. Relief is great with 3,000- to 5,000-foot peaks rising 2,000 to 3,000 feet above the valley floors. Crow Pass is approximately 3,500 feet in elevation while Indian Creek Pass is 2,300 feet.

From Knik to the south slope of the Alaska Range, the gently rolling lowlands of the Susitna River valley are traversed. Rainy Pass provides a comparatively short gentle route through the rugged Alaska Range, reaching an elevation of approximately 3,350 feet. Peaks in the area exceed 5,000 feet. From Farewell Lake on the north side of the Range to Takotna, the route crosses the extensive Kuskokwim River valley. Relief is low and elevations range from 400 to 1,000 feet.

The low mountains, hills, and ridges of the Kuskokwim Mountains extend northeast to southwest across the Ophir and Iditarod region in the upper Innoko River drainages. Relief is moderate with most ridges and peaks between 2,000 and 3,000 feet, dissected by broad valleys 200 to 1,000 feet in elevation. Similar relief is encountered across the Kaiyuh Mountains which are separated from the Kuskokwim Mountains by the low flats of the Innoko River.

After crossing the Yukon River at Kaltag, the route follows the broad Unalakleet River valley through the adjacent Kaltag Mountains, averaging 2,000 to 3,000 feet in elevation. After reaching Unalakleet, the trail generally stays at or near sea level as it skirts the barren coastline of Norton Sound to Nome.

Vegetation

The different climatic zones, permafrost conditions, wildfire, topography, and soils encountered along the route combine to provide a wide variety of vegetative ecosystems. Alpine tundra is found in the passes of the Chugach Mountains, the Alaska Range, and the Kuskokwim Mountains between Ophir and Iditarod. Wet tundra is found in areas around Norton Sound. Over much of the Seward to Turnagain Arm area, a coastal western hemlock-Sitka spruce forest system exists up to an elevation of 2,000 to 3,000 feet. From Knik to the Alaska Range, lowland spruce-hardwood forests and bottomland spruce-poplar forests are encountered.

On either side of Rainy Pass, an upland spruce-hardwood forest is present up to an elevation of approximately 2,500 feet. The Kuskokwim valley is largely covered with lowland spruce-hardwood forest, as is the Innoko River valley. The valleys through the Kuskokwim Mountains, the Kaiyuh Mountains, and Kaltag Mountains are generally covered with an upland spruce-hardwood forest. A major high brush system is located in the Nome area.

Throughout the forested areas, many open areas of muskeg, marshes, shallow lakes, and grass tussocks are found. Dense willow and alder thickets are common along rivers and streams.

Fish and Wildlife

Large game animals are common throughout the region, although most populations are sparse in relation to land area because of the harsh climatic conditions and absence of available winter food. Caribou, moose, Dall sheep, black bear, brown/grizzly bear, and wolves are present locally in varying populations. Fur-bearers--including lynx, wolverine, beaver, mink, river otter, weasel, marten, and muskrat--are relatively abundant over much of the interior.

Important waterfowl nesting areas are located in the Innoko and Kuskokwim valleys and along the shores of Norton Sound. Common raptors in the area include the northern bald eagle, golden eagle, osprey, and a variety of hawks and owls. In addition, the endangered American peregrine falcon is believed to be present in the area.

Sport fish species common in various areas of the route include grayling, arctic char, northern pike, Dolly Varden, lake trout, rainbow trout, and five species of salmon. In the Norton Sound region, along the Yukon, and in the Seward area, commercial and subsistence fishing for salmon plays an important part in the local and regional economies.

During the summer, mosquitoes and biting flies are so numerous in places that unprotected persons risk serious injury. Even repellants and headnets are not always adequate protection against the endless attack.

Minerals

Areas underlying the route are potentially favorable for geothermal energy development, uranium, copper, lead, zinc, gold, silver, and other minerals. The segment of the route between Kaltag and Nome passes through several areas identified as having high potential for mineral development. In the Nome area, potential development of gold, lead, zinc, silver, barium, tin, antimony, and tungsten is indicated. In addition, the Unalakleet River area and most of the route along the east shoreline of Norton Sound are identified as having low potential for oil and gas.

The Iditarod-Ophir-Takotna region is identified as having high potential for gold development. In addition to gold, there is a high potential for tin in the Poorman area.

A portion of the Kuskokwim valley east of McGrath traversed by the route has low potential for oil and gas. Although high potential for gold, copper, lead, and zinc is indicated in areas to the north and south, no potential is identified along the route through the Rainy Pass region.

The lower Susitna River valley has moderate to high potential for oil, gas, and coal. The Upper Cook Inlet and Chugach Mountain regions have a high potential for chromium, nickel, platinum, copper, and gold.

Land Uses and Access

With the exception of a few small towns and Native villages, the route between Knik and Nome is largely uninhabited. Little land has been cleared and a primitive environment exists over much of the distance. Hunting, fishing, trapping, berry picking, and log cutting are taking place around villages and towns. These activities generally occur within a radius of 30 miles of the settlements.

Mining operations continue at many locations along the route, including Nome and vicinity, Ungalik, Cape Nome, Flat, Ruby, Lime Hills, Steelmute/Barometer, and Iditarod.

Nearly 200,000 persons live between Seward and Knik. This area surrounding Anchorage is the largest population concentration in Alaska. Urban development is occurring rapidly and much of the land is being used for residential, agricultural, recreational, commercial, and industrial purposes.

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Between Seward and Knik, a major highway system exists which affords access to the historic trail at numerous points. Beyond Knik, no portion of the historic route is road accessible from the major highway net. However, short unconnected roads exist between Sterling Landing, just south of McGrath, through Takotna to Ophir; between Iditarod, Flat, and Discovery; between Poorman and Ruby; and between Solomon and Nome.

Airstrips are found at most settlements along the trail and McGrath, Galena, Unalakleet, and Nome are served by regular commercial jet service. The villages along the Yukon, including Ruby and Kaltag, and the villages around Norton Sound are served at least once a week by smaller commercial aircraft. The Alaska Railroad connecting Seward and Whittier with Anchorage and Fairbanks crosses the trail at a number of points.

General Land Ownership

Most (84 percent) of the land along the route is currently in public ownership. The State currently owns most of the trail (63 percent) with most of the remainder almost evenly divided between the Federal government (20 percent) and Native corporations (16 percent). With the exception of the section owned by the Alaska Railroad, from Seward to Girdwood through the Chugach National Forest, the federally owned segments currently are managed by the Bureau of Land Management.

The Alaska Statehood Act and the Alaska Native Claims Settlement Act of 1971 (ANCSA) set in motion substantial changes in future land ownership and management in Alaska. Approximately 40 million acres are being selected for ownership by Native corporations and 103 million acres by the State of Alaska. Additionally, some 90 million acres of public domain lands have been recommended for inclusion in the National Park, National Wildlife Refuge, National Forest, and National Wild and Scenic Rivers Systems.

Most of the land around Norton Sound from Unalakleet and Nome has been withdrawn for Native selection. Similarly, most of the land along the Yukon River from Ruby to Kaltag has been withdrawn for Native selection, although the Yukon riverbed itself is claimed by the State. The villages of Takotna and McGrath will also be selecting lands along the route in the Kuskokwim River valley. The village of Eklutna is currently selecting several townships through which the route passes.

The State of Alaska has made land selections covering most of the route through the Alaska Range and through the Kuskokwim Mountains. In addition to State lands already patented in the Susitna River valley, the routes over Crow Pass and Indian Creek Pass are included in Chugach State Park.

Of the 90 million acres proposed for addition to the four national conservation systems, three proposals include lands along the route. The Innoko lowlands around Dishkaket are included in the Koyukuk National Wildlife Refuge proposal and the Kuskokwim River valley between the Alaska Range and McGrath is included in the Yukon-Kuskokwim National Forest proposal. The lands surrounding the upper 50 miles of the Unalakleet River are included in the Unalakleet National Wild River proposal.

Native lands selections continue, action on proposed additions to the national systems are to be taken by December 1978, and all State land selections made by 1985.

In addition to Native lands which will be privately owned, many small tracts between Seward and the Knik area are in private ownership. Some private land and an undetermined number of mining claims also exist in the Iditarod-Flat, Ophir, and Takotna areas.

Virtually all of the route was part of the territorial system of roads and trails and was maintained by the Alaska Road Commission using Federal and/or territorial monies. The State of Alaska maintains that a right-of-way still exists in the name of the State along all such roads and trails pursuant to revised Statute 2477 authorized by Congress in 1866.

The current Bureau of Land Management land status records show a reservation under 44LD513 (Department of the Interior land decisions) for the section of the route between Kaltag and Unalakleet. As such, this segment would be reserved for public purposes in Federal ownership should patent be transferred.

Section 17(b) of the Native Claims Act directs the Secretary of the Interior to reserve easements for public use and access as he determines are necessary on lands selected by village or regional corporations. The Bureau of Land Management is currently receiving recommendations from various agencies and the public for easements, including portions of the Seward-Nome route, across lands selected by Native corporations. Easements must be identified prior to the final conveyance of patent to the various corporations over the next several years.

A general listing of land ownership is summarized in Table II.

HISTORIC RESOURCES

Period and Type of Use

Seward-Susitna

From 1896 to 1917, thousands of people passed over the route from Seward and Whittier to Hope, Sunrise, Girdwood, Knik, and Susitna. Because

TABLE II. Summary of Existing or Potential Ownership of Trail Segments

	MILES	PERCENT
Federal		
U. S. Forest Service	139	7
Bureau of Land Management	85	4
Fish and Wildlife Service	81	4
U. S. Army	13	1
Alaska Railroad	75	4
Subtotal	393	20
State	1,279.5 1/	63
Local Governments	26	1
Native Corporations	336 2/	16
Other Private	2.5	+
TOTAL	2,037	100

1/ Includes existing roads and highways and the Yukon riverbed.

2/ Public easements have been proposed along all or most of this distance.

Cook Inlet provided good boat transportation in the ice-free season, most of the trails were used largely as winter trails when packed snow provided a smooth surface over normally rough or wet terrain. Winter travel was most common by dog team, although many persons walked or snowshoed the trails. Occasionally, horses, sometimes outfitted with snowshoes, traversed the route, although limited winter forage prevented widespread use. Many of the trails were broken regularly by mail carriers.

A few routes were also used in the summer by pack horses. Harry Revelle had one of the first pack trains which operated between Sunrise and Hope around the turn of the century.

As the Alaska Railroad was completed farther and farther north from Seward, trail segments were abandoned. After 1910, the railroad grade was utilized between Seward and Kern Creek. After completion of the railroad from Kern Creek to Wasilla through the new town of Anchorage in 1918, the trails over Indian Creek and Crow Passes were seldom used. When the rails were laid to Wasilla and then north to Nancy and beyond, the bypassed town of Knik also was all but abandoned. In 1920, a new trail was built from Nancy to Susitna which virtually ended travel through Knik. Also by 1920, summer wagon roads and car roads had replaced major segments of the old routes.

World War I hastened the decline of gold mining in the region and it never again reached the prominence experienced in the early 1900's. Mines in the Hope-Sunrise area and in the Willow Creek area closed down as manpower was drawn off by the war and by railroad construction. However, several mines continued operating until the early 1950's.

Susitna-Kaltag

The first rush to the Innoko district occurred from the Yukon River in early 1907. Overland winter trails began to be established from Lewis Landing and Kaltag to the Ophir area at that time. These trails were extended to the Iditarod district after gold was discovered there during the winter of 1908-09. Peak gold production took place in both districts in 1912. At that time, hundreds of persons annually were traveling the newly constructed Iditarod Trail between Seward and Knik and the mining districts. Heavy traffic continued over that trail until around 1920. By then, mining activity had declined substantially and the Alaska Railroad had been completed north of the Alaska Range.

Although Goodwin's Rainy Pass-Kaltag Trail was intended to shorten the winter mail route from Seward to Nome by over 300 miles, the trail was never used for this purpose. The mail contract continued to be won by carriers using the route from Valdez through Fairbanks, down the Yukon River, and over the Kaltag-Nome trail. Between 1910 and 1914, the mail to the Innoko and Iditarod districts also was carried down the Yukon from Fairbanks, even after the completion of the

Iditarod Trail from Seward. The mail route left the Yukon River at Kaltag or Nulato and continued through Dishkaket to Ophir and Iditarod.

In 1914, Harry Revelle won the winter mail contract to Iditarod and took the first mail from Seward over the Iditarod Trail to Ophir and then south to Iditarod. This service continued through the winter of 1918-19. In 1919, however, the Alaska Railroad was completed to Rex on the north side of the Alaska Range and the mail was again carried along the Yukon to Ruby and then south to Ophir and Iditarod.

During the winter of 1920-21, the contract was returned to the Iditarod Trail for one final season. Despite cutting a reported 3 weeks off the delivery time to McGrath, the completion of the Alaska Railroad to Fairbanks and the opening of a new trail to McGrath between the Tanana and upper Kuskokwim Rivers marked the end of most use and the rapid abandonment of the Iditarod Trail. After 1914, most of the trails from Kaltag, Nulato, and Lewis on the Yukon to the Ophir and Fairbanks areas were seldom used and were abandoned by 1923. The rise of air mail service in the late twenties eliminated use of most remaining trail segments.

The summer routes between Ruby and Ophir, Ophir and Flat, Sterling Landing (near McGrath) and Takotna and Ophir continued to be improved and are still used today. Winter routes in the McGrath area are also still in use.

Almost all of the early trails along this segment of the route were winter trails used by dog teams, foot travelers, and occasionally by horses. The normal travel season began at the end of October and extended through April. March and early April were the most popular times to travel because of favorable conditions. Most supplies were brought in and gold shipped out by boat. However, in December 1911, Wells Fargo reportedly mushed out nearly one-half million dollars in gold over the trail to Seward. Because of rough terrain and frequent bogs, only a few people are known to have crossed the route under snow-free conditions. Horse-pulled wagons and then motor vehicles hauled supplies and equipment over the road from the river port at Takotna to Ophir and between Iditarod and Flat. A tramway which utilized log rails and a Model "T" Ford automobile also operated between Iditarod and Flat.

Kaltag-Nome

Although the rush to Nome occurred between 1898 and 1900, peak gold production was not reached until 1905 and 1906. It was at this time that the Kaltag-Nome trail began to be used on a regular basis to carry mail from Fairbanks to Nome. Overland mail service continued and the trail was maintained by the Alaska Road Commission until the mid-1920's when aircraft replaced the dogsled for this mail route. Because major sections of this trail utilized the frozen waters of Norton Sound and adjacent lagoons, it was almost exclusively a winter route.

WINNER
ST PATRICKS DAY RACE – IDITAROD ALASKA
– JOHN HOLMES ENTRY – HARRY SHEPPARD DRIVER –

Early Iditarod musher. Photo from Iditarod Trail Annual by Dorothy Page, photo provided by Lillian Carmichael.

MEALS
LUNCHES
AT ALL HOURS
FORKS ROADHOUSE
E.L. CULLEN PROP.
CIGARS

Historic Roadhouse along the trail on Seward Peninsula. Photo from Iditarod Trail Annual by Dorothy Page, photo provided by Lillian Carmichael.

This segment was also used by winter travelers to and from various villages around Norton Sound and by local hunters and trappers.

The section between Kaltag and Unalakleet had been used as a portage trail between the Yukon River and Norton Sound for hundreds of years prior to the gold rush. Eskimos from Norton Sound and Athabascans from the Yukon Valley traded over the route. Other sections around Norton Sound were also used, possibly for thousands of years, by Native peoples traveling between camps and villages.

In 1901, a portion of the Washington-Alaska Military Cable and Telegraph System (WAMCATS) was completed over the Kaltag-Unalakleet section linking Nome and St. Michaels with interior Alaska. The route generally followed the old and new trail alignment and was regularly used for line maintenance by the Army Signal Corps. Soon after 1910, most segments of the trans-Alaska telegraph system were replaced by wireless communication.

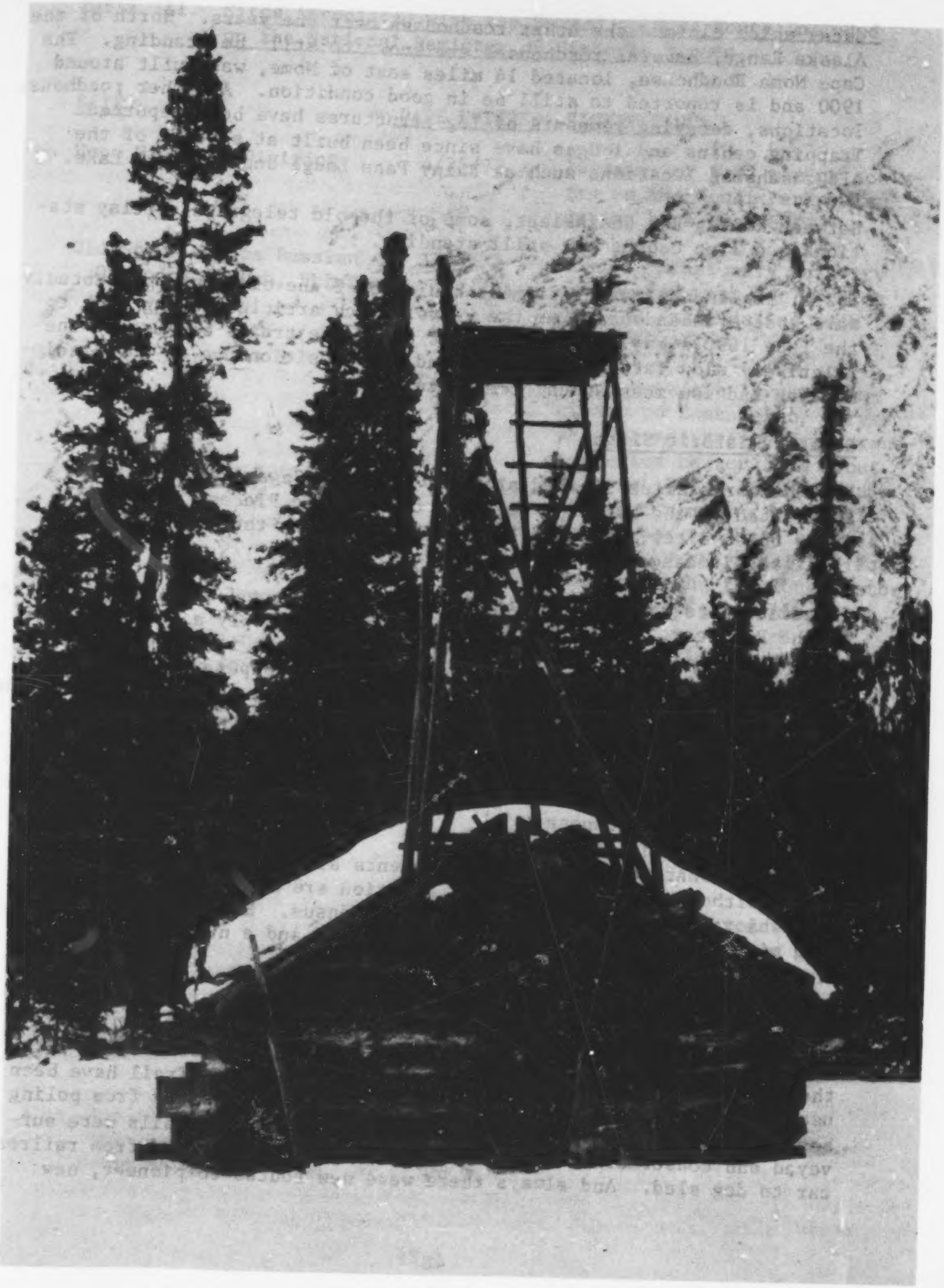
Historical Trail Remnants

Highways, the Alaska Railroad, wagon roads, and tractor trails have been superimposed on many old trail segments, especially in the Seward to Susitna area and around Ophir and Iditarod. However, traces of the historic route are still visible in the alpine areas of Indian Creek, Crow, and Rainy Passes. Although very overgrown, sections are also visible in the forested areas between Knik and McGrath because of the relatively slow rate of tree growth in this region. It is not known if remnants exist in the Ophir-Iditarod area or between there and the Yukon River.

From Kaltag to Unalakleet, the historic trail and telegraph route can be observed. Some telegraph wire and a few of the supporting tripods still can be found along the route. The trail from Unalakleet to Nome generally followed the barren shoreline and ice of Norton Sound. Only a few short segments which cut across peninsulas of forest or tundra are still visible. Most of these are still used today by Native people traveling between villages.

Virtually the entire length of the Seward to Nome route was covered at regular intervals by roadhouses (see topographic maps at end of chapter). Every 15 to 30 miles, 1-day's hike or mush, these roadhouses provided food and lodging to mail carriers and other travelers. Even before a new trail was completed, choice roadhouse sites were staked along the route. As Goodwin thrashed his way through virgin territory between the Kuskokwim and Rainy Pass in the winter of 1910-11, the only people he reported seeing were two men selecting sites and putting up roadhouses.

South of the Alaska Range, only the old roadhouse at Skwentna has survived fire, vandalism, firewood gathering, stream bank erosion, and



Rohn River Roadhouse. (Bureau of Outdoor Recreation) decay which claimed the other roadhouses over the years. North of the Alaska Range, several roadhouses are known to still be standing. The Cape Nome Roadhouse, located 14 miles east of Nome, was built around 1900 and is reported to still be in good condition. At other roadhouse locations, decaying remnants of log structures have been reported. Trapping cabins and lodges have since been built at several of the old roadhouse locations such as Rainy Pass Lodge and Farewell Lake.

Between Kaltag and Unalakleet, some of the old telegraphic relay stations and line cabins are still standing.

Tools, implements, and equipment hauled over the old route undoubtedly were lost or abandoned over the years. Such articles dating back to the late 1890's may still be present along the trails because of the relatively slow rate of oxidation and decomposition due to low precipitation and low mean annual temperatures.

Related Historic Sites

Five historic sites located along or near the Seward to Nome route are listed in the National Register of Historic Places. Table III lists these sites, the date they were entered on the Register, and their significance.

In addition to these sites, the townsite of Iditarod has been nominated to the Register. Iditarod is now a ghost town. Only a few buildings now remain where once 600 to 700 people lived. In its heyday, the town had a telephone system, a tramway, two newspapers, four hotels, three lumber companies, a fire hall, nine saloons, a school, and churches.

The nearby mining town of Flat is now nearly deserted. From a peak of 400 people, only a few miners live there; most, seasonally. However, unlike Iditarod, many old structures and mining equipment remain in and around the town.

Historic structures and mining implements also exist in and around Ophir, although their number and condition are not known. No population was reported for Ophir in the 1970 census. However, several small gold mining operations have been reactivated and a number of people are known to be living in the area.

Historical Significance

From the earliest Native trails, based on trade and warfare, up to the present day, the various segments of the Iditarod Trail have been used throughout Alaskan history. River transport evolved from poling boats to luxurious paddle-wheel steamers. Roads and trails were surveyed and constructed. At some places, travelers shifted from railroad car to dog sled. And always there were new routes to pioneer, new

TABLE III. Sites Associated with the Seward to Nome Route Included on the National Register of Historic Places

SITE	DATE ENTERED	SIGNIFICANCE
Hope Historic District	4/25/72	Evidence of gold mining activity on the Kenai Peninsula dating back to 1888.
Old St. Nicholas Russian Orthodox Church, Eklutna	3/24/72	Russian missionary activity associated with fur trading in Cook Inlet dating back to mid-1880's.
Knik	7/23/73	Knik, once the largest community on Cook Inlet, served as regional trading and transportation center from about 1898 to 1917. Includes Knik Museum containing materials dating back to Knik's heyday and "Dog Mushers Hall of Fame" commemorating the long history of dog mushing in Alaska.
Iyatayet Site, Cape Denbigh Peninsula, Norton Sound	10/15/66	One of earliest such sites found, dating back to 6000 B.C., it has given definite sequential evidence of coastal occupation beginning with the Denbigh flint industry. Site has given substance to the assumption that the first people in the Americas came south from Alaska.
Anvil Creek, Nome	10/15/66	Alaska's great gold rush began when the first large gold placer strike was made here on September 20, 1898.

techniques of winter travel to perfect. Even today, the route between Unalakleet and Nome is new every year, a product of the winter ice of Norton Sound.

In a world where primitive land areas have largely disappeared, the Iditarod Trail traverses an isolated and vigorous environment where present-day travelers can duplicate the experiences of their forebearers. A vast and uncompromising land, over large sections unpopulated and far from human development, it requires reversion and adaptation to the conditions of an earlier time by those who would travel it. The words of one Alaskan pioneer, Alfred Brooks, quoted earlier in this report, recall Jefferson's tribute to the men of the frontiers of a still earlier America. Says Brooks, "Many a man who had not developed beyond mediocrity in his own community, tightly bound by tradition and custom, found in Alaska his opportunity and rose to his true level." It is this opportunity to rise to the challenge that gives the Seward-Nome Route National Historic Trail proposal its distinction. Along the course of the trail, old structures and artifacts of Gold Rush times can be found, which heightens the experience of today's adventurer.

None of the various segments of the Seward to Nome route were ever trampled by the rush of thousands of people as were the Chilkoot Pass and White Pass Trails to the Klondike in 1898. Most rushers to the Hope-Sunrise area, the Willow Creek District, the Nome area, the Innoko, and the Iditarod came by steamer. Yet, once in the gold fields, there became a vital need to establish communication and supply lines with the outside world during the long periods when ice and snow sealed off the water arteries. The winter trail system which developed almost from the inception of the original strikes became the lifeline of the mining towns for over 6 months of the year. Even as late as 1925, the importance of the trails was emphasized when a diphtheria epidemic broke out in Nome. Serum was rushed by dog team from Nenana in time to save many lives.

The Iditarod Trail between Seward and the diggings in the Innoko and Iditarod Districts was of particular significance. The Iditarod strike was the last big bonanza in the waning Alaska Gold Rush Era. Total production of placer gold from the Iditarod ranks third, only behind Nome and Fairbanks, among all the mining districts in Alaska. The Innoko ranks fifth. The combined production of these two districts represents more than 9 percent of all placer gold produced in Alaska. In its peak year, 1912, Iditarod produced approximately $3 million in gold or one-fourth of Alaska's total placer production during that year.

Travel up the Yukon, Innoko, and Iditarod Rivers was slow and tedious. Thus, although most of the initial stampeders and later, supplies, arrived by boat, many travelers to the Iditarod country after 1910 preferred overland travel. The trail received publicity in various magazines stimulating trail travel into Alaska's interior by people from many states and other countries. In this sense, the route had national as well as statewide significance.

In addition to newly arrived persons mushing or walking over the trail after getting off ships in Seward, Whittier, or at the mouth of Ship Creek (Anchorage), hundreds of people engaged in summer mining operations utilized the route semiannually. A large exodus generally followed freeze-up in October when most mining operations terminated. Many over-wintered outside Alaska or in larger Alaskan communities. Prior to break-up in late April or May, the mining towns swelled with returning people.

The importance of the Seward to Nome route is also underscored by the funds expended for construction and maintenance of the various trail segments by the Alaska Road Commission. By 1924, over $175,000 of Territorial and Federal funds had been spent on the major trail segments between Kern Creek and Nome, excluding the substantial investment in the roads between Takotna and Ophir and between Flat and Iditarod. In the early 1900's, this represented a significant portion of the Alaska Road Commission's budget for trails.

The segment between Kaltag and Nome also is of anthropological and archeological significance. Native travelers, who predated the stampeders by perhaps thousands of years, utilized the routes around Norton Sound in their hunting, trapping, and fishing activities, as well as for access to the various camps and Native groups. Archeological sites, such as the one on the Cape Denbigh Peninsula, which could reveal more information about ancient inhabitants of the region and perhaps about the origin of man in North America, undoubtedly exist along the route.

The trail's most important remaining historical resource is its environment. The landscape, climate, and distances that shaped its early use remain. This historic trail--if it remains primitive and demanding in its larger parts--will continue to provide the setting for active involvement in a geography where distance, terrain, and climate are major determinants of people's actions.

PRESENT AND PROSPECTIVE TRAIL USES

Present Trail Condition

Only a small fraction of the hundreds of miles of the historic route are currently maintained as trails. The U. S. Forest Service maintains a 4-mile summer hiking trail which generally follows the old trail alignment up to Crow Pass from the Girdwood area. Another 22-mile trail following the branch route up Johnson Creek and down Bench Creek to the Hope-Sunrise area from the railroad is also maintained by the Forest Service, as well as a 5-mile trail along a portion of the Hope-Sunrise route. A 20-mile crude winter trail exists over Indian Creek

Pass and a 4-mile segment up Indian Creek to the Pass has recently been improved for summer use by the State Division of Parks.

The Girl Scouts, under the direction of the State Division of Parks, recently reestablished the historic trail between the Forest Service Crow Pass Trail and the end of the road leading up the Eagle River valley. This 21-mile recreation trail located within Chugach State Park is now maintained by the Division of Parks.

Other segments, although not publicly maintained, continue, through use, to be passable winter trails. These include segments in the McGrath-Takotna area, between villages along Norton Sound, between Kaltag and Unalakleet, and between Knik and Susitna. In the past several years, the State Deparment of Highways has provided local villages with money and materials for flagging and marking trails between the various villages from Kaltag to Nome. Many of these routes follow the historic Kaltag-Nome Trail. Because of changing snow and ice conditions, windfalls, and brush growth, these trails can vary in location by as much as a mile or two from year to year. Unless well traveled, breaking trail along these routes by foot, dog team, or snowmachine can be a grueling ordeal.

The summer trails developed in the early 1920's between Ophir and Flat and between Poorman and Ophir are believed to be utilized occasionally by vehicles primarily involved in mining operations.

The segment over Rainy Pass through the Alaska Range is still visible in places, although badly overgrown by brush and altered by snow and rock slides in places. This segment is passable, although difficult, in summer and winter. A jeep road and summer trail is also utilized over a part of the old Portage Glacier route from Whittier to the pass area overlooking the glacier.

Most of the remaining segments are either not readily locatable or are too altered or overgrown to permit travel. Except for those segments over mountain passes, virtually all remaining portions of the route are ill suited for summer travel. As the historic trails made ample use of frozen lakes, rivers, muskegs, and marshes, summer trail conditions are extremely poor if not impassable. Additionally, the winter snow conceals an extremely rough ground surface, in most places due to stumps, fallen trees, low brush, frost-heaved hummocks and tussocks, and other obstacles.

Several segments of the old trail route are easily traversed and continue to be maintained as roads and railroads. Gravel roads now connect Nome and Solomon, Flat and Iditarod, Ophir and Takotna and Sterling Landing, and Poorman and Ruby. Highways overlay several old segments between Seward and Knik with extensions to Sunrise and Hope and up the Eagle River valley and Crow Creek valley for several miles. The Alaska Railroad follows the route alignment between Seward and Kern Creek and by tunnel under the Portage Glacier pass from Whittier.

Cross-country skier near Indian Creek Pass in Chugach State Park. (Bureau of Outdoor Recreation)

Scenic and Recreational Qualities

Portions of the major route and branch segments on the Kenai Peninsula and in the Anchorage area are highly scenic and accessible in both summer and winter. The route often parallels swift streams through deep mountain valleys. In a matter of hours, a range of ecosystems and even seasons can be experienced as one proceeds from the dense spruce forests of river valleys, to the small poplar groves on the hillsides, to the alpine tundra above, and finally to the rock rubble, snow fields, and glaciers on mountain peaks. The proximity of the Anchorage urban area and the easy access by road and railroad give this 250+ mile segment of the route high recreational value for day and weekend use. The presence of some developed trails and recreational facilities along this segment further increase its recreational attractiveness.

Beyond Knik, many different recreational qualities are encountered. Access from the state highway net is not available and most of the land is uninhabited. Over much of the distance, a wilderness environment exists. The recreational values associated with wilderness are quite rare nationally, although more common in Alaska.

Offsetting these special wilderness recreational qualities are, of course, the inherent problems of access to and travel through large stretches of primitive country. Access is only available by commercial and/or charter aircraft. Summer overland travel along most of this route is nearly impossible. Thickets, windfalls, tussocks, muskegs, lakes, mosquitoes, and other obstacles continually impede travel, especially across the vast low valleys of the Susitna, Kuskokwim, and Innoko valleys. The route through Rainy Pass is an exception to these general conditions because of the continuous high terrain and predominant alpine vegetation.

Winter offers far superior travel conditions although the severe cold, deep snow, and long distances severely limit recreational use to only the very hardy. An added benefit of the long winter is the absence of the mosquito. The presence of this insect cannot be overrated in describing the adversities of summer travel, especially in lowland areas.

The environment traversed between Knik and Unalakleet offers a primitive beauty. Plant and animal communities are, for the most part, in their natural state and nature study and photographic opportunities abound. The presence or absence of streams, bogs, permafrost, slopes, and other features create a continuous mosaic. While vegetation provides a degree of scenic diversity, the topography over large segments of the route is fairly uniform. The extensive rolling to flat lowlands provide few scenic vistas and long distance travel can become monotonous.

The mountainous areas along the route are exceptions to this uniformity. From the southern flank of the Alaska Range, magnificent views of Mt.

McKinley can be observed to the north across the broad Susitna River valley. The section through the Alaska Range over Rainy Pass possesses outstanding scenic values. The sections through the Kuskokwim and Kaltag Mountains also have exceptional scenic qualities. The Unalakleet River has been proposed as a National Wild River area and would include much of the trail route between Kaltag and Unalakleet. The high scenic and recreational qualities identified in this river area would also be associated with the trail section.

The character of the route segment along the shoreline of Norton Sound varies more between winter and summer than along any other route segment. In winter, when continuous trail travel may be possible, a treeless landscape/seascape, swept by blowing snow, affords a bleak recreation picture. With summer, the scene transforms dramatically. As the Bering Sea ice recedes, sea mammals are seen offshore, salmon make their way up streams by the thousands, the tundra comes alive with flowers and berries, and blues and greens replace white as dominant colors. At the same time, the melting of snow and ice means the destruction of the trail. Where frozen lagoons and sea ice were used to bridge barrier dunes and spits, only open water remains.

Recreational Uses

Most current recreational use of the route occurs in the Seward-Susitna region. Between Seward and Girdwood and between Eagle River and Knik, much of this use is in the form of driving for pleasure, picnicking, and sightseeing. A highway and railroad cover much of these segments.

The Forest Service recreational trails up to Crow Pass and across Johnson Pass receive heavy summer use by hikers. Two public use cabins on these trails are reserved most days of the summer. Summer use of the Crow Pass trail is estimated at 300 persons per week, while 50 persons per week are estimated to use the Johnson Pass Trail. The 22-mile Johnson Pass Trail also receives winter use by snowmachiners and cross-country skiers. Unfortunately, an avalanche destroyed the public cabin at Bench Lake during March 1975.

The section from Crow Pass down to Eagle River (approximately 21 miles) also receives summer hiking use. The completion of a hiking trail during the summer of 1975 has increased use. The Eagle River valley is also used heavily in the winter by cross-country skiers and snowmachiners.

The 20-mile Indian Creek Pass section between Anchorage and Indian Creek is traversed annually by cross-country skiers. The improved trail up Indian Creek to the pass also attracts summer hiking use.

Between Knik and Susitna, the many trails also receive winter use by dog mushers, snowmobilers, and cross-country skiers. Most of this use,

Hikers along Johnson Pass Trail in Chugach National Forest.
(U.S. Forest Service)

however, takes place within 10 to 12 miles of Knik. Some summer hiking use of the Iditarod Trail occurs up to 4 miles from Knik.

A jeep road and trail from Whittier up through Portage Pass also receives summer hiking and recreational vehicle use.

Hiking, fishing, hunting, recreational gold panning, and berry picking are popular summer and fall activities all along the road system in this area. Similarly, cross-country skiing and snowmachine use occur over much of the route in the winter where the highway or railroad provide access to adjacent day-use areas. An annual train trip sponsored by the local ski club brings hundreds of cross-country skiers into the Grandview area along the trail, 50 miles north of Seward.

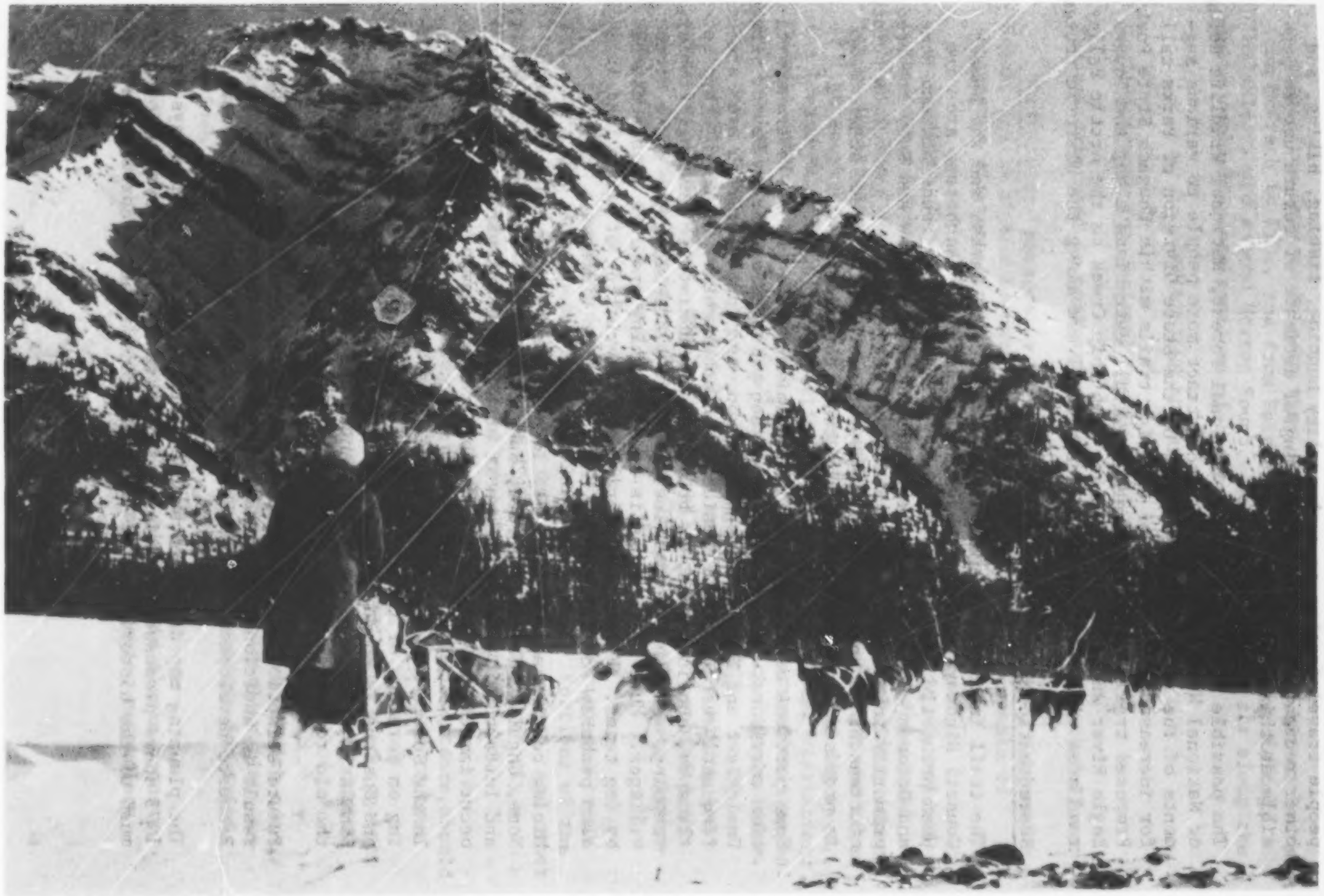
Beyond the Susitna River, recreation use is primarily non-trail oriented. Fly-in fishing and hunting are the principal activities. This use is not very extensive or intensive at the present time. Hiking and wilderness guiding takes place across Rainy Pass, although the level of this use is believed to be low. Light recreational hunting, fishing, and travel around the several towns and villages along the route probably occurs, although most such activity is geared to a subsistence lifestyle. Winter recreational use is even lighter. Some recreational snowmachine use and cross-country skiing probably occurs in the vicinity of Nome, McGrath, and west of the Susitna River.

Each March since 1973, approximately 40 mushers and 400 dogs traverse major portions of the Iditarod Trail as part of the Anchorage to Nome sled dog race, although only about half the entrants reach Nome. The sled dog race follows the route closely except between Ophir and Kaltag and through the Alaska Range. Instead of cutting directly across the Innoko valley to Kaltag, the race route follows the summer trail north from Ophir to Poorman and then the road to Ruby. Between Ruby and Kaltag, the Yukon River is utilized. This route was selected because it passes through several Native villages where dog mushing used to be extremely popular and important before the days of the snowmachine. With the new interest in dog racing developing in Alaska and the excitement generated by the Iditarod Trail Race, dogs have again returned to the Yukon villages.

Recreation use in the area of the Seward-Knik segment is expected to increase. Hiking, cross-country skiing, and off-road vehicle use will gain in popularity as the population in southcentral Alaska expands. Should such use lead to additional major trail developments or other environmental impacts, the appropriate managing agency or agencies will prepare the necessary environmental impact statements covering the actions.

Although the largest increases in use can be expected in areas closest to Anchorage, recreation use, both summer and winter, will increase moderately north of Knik and Susitna and in the Rainy Pass area as

Hiker and rock cairn along the Iditarod Trail near Crow Pass in Chugach State Park.
(Alaska State Division of Parks)



A musher in the annual Iditarod Trail Sled Dog Race nears the Rohn River checkpoint in the Alaska Range. (Bureau of Outdoor Recreation) people travel farther to seek quality hunting, fishing, hiking, and other recreation areas. No meaningful estimate of future use is possible at this time.

The possible creation of a new National Forest, National Wildlife Refuge, or National Wild River would also attract more people to various segments of the route. Future plans by the State Division of Parks call for increased development of existing trails within Chugach State Park. Proposed trailhead developments and trail extensions along the lower Eagle River and from Indian Creek down Ship Creek to the Arctic Valley road area will also increase recreational use along the historic routes.

Nonrecreational Uses

The trail involves the existing Seward, Glenn, Parks, and the Nome-Council Highways. The highways and roads in the Anchorage area are used primarily for transportation. Similarly, the roads between Nome and Solomon, Ophir and Sterling Landing, and Poorman and Ruby are used primarily for basic transportation and the hauling of goods from points of transfer to towns and mining operations. The Western Access Road is proposed along portions of the trail corridor.

Some portions of the old trail are similarly used as basic transportation corridors. Winter trails between villages on Norton Sound, between Unalakleet and Kaltag, along the Yukon, and in the McGrath area are frequently used by local residents on snowmachines to reach other settlements, hunting areas, or trap lines. Subsistence hunting, fishing, trapping, and other activities also take place along the route around villages. Much of this use is by snowmachine and to a lesser extent by dog teams. Firewood gathering and the cutting of house logs is also probably occurring along the route near villages.

Mining continues at a number of locations along the route including Nome, Ungalik, Cape Nome, Flat, Ruby, Lime Hills, Steelmute/Barometer, and Iditarod. It is not known if such mining activities actually occur immediately adjacent to major trail alignments.

In the Seward-Knik area, residential and commercial uses are infringing on portions of the old trails. Some of the old trail between Knik and Susitna is known to cross private homesteads and other property. Similarly, the towns around the Anchorage area overlie portions of the old route.

Future selections of public domain lands by Natives and the State could result in additional nonrecreational uses of lands along the route. Resource development by the State and Native groups is expected.

The planning map developed by the State Department of Highways in July 1973 shows proposed extensions of the transportation system covering much of the historic route. Surface transportation corridors are proposed from Knik to McGrath through Rainy Pass, from Ophir to Poorman, from McGrath to Flat, and from Fairbanks to Nome via Ruby, Kaltag, Unalakleet, and around Norton Sound. Several dam proposals along the Yukon would inundate portions of the route.

CONCLUSIONS AND RECOMMENDATIONS

Qualifications for National Scenic Trail Designation

The criteria used in evaluating the Seward-Nome route are as follows:

Criterion: Because of their special characteristics, National Scenic Trails should be nationally significant and be capable of attracting visitors from throughout the United States.

Finding: The Seward-Nome Route (Iditarod Trail) is of national significance because of the prominent role it played in the Alaska Gold Rush Era. Not only are its historic values of outstanding importance, but it traverses some of Alaska's most scenic terrain and areas of high recreational value. Presently, except for the sled dog race, the Seward-Nome Route is attracting little more than local visitation. However, much of the route has important scenic and recreational appeal and visitation from beyond the local area can be expected to increase.

Criterion: National Scenic Trails are designed for hiking and other compatible uses. The National Trails System Act prohibits the use of motorized equipment on these trails, except in certain circumstances.

Finding: The Seward-Nome route is primarily a winter-use trail and one of the main means of use is the snowmachine. Portions of the trail are adaptable to and are being used for hiking, skiing, and other compatible forms of recreation, but these portions comprise only a minor amount of the total length of routes or trails involved.

Criterion: National Scenic Trails of historical importance should adhere as accurately as possible to their principal historic routes.

Finding: Except for short portions of the Iditarod sled dog race trail, the Seward-Nome route follows the historic trails used during the Gold Rush Era.

Criterion: National Scenic Trails should be provided with adequate public access through connecting local or regional trails. Access should be located at reasonable intervals to provide for trips of various lengths.

Finding: The widespread use of the airplane in Alaska opens up to use virtually all portions of the Seward-Nome route, regardless of the season of use. Only the Seward-Knik leg is readily accessible by the more conventional means of road or railway.

Criterion: National Scenic Trails should be primarily land based.

Finding: The Seward-Nome route primarily crosses land areas, although significant portions of the route follow rivers or cross lakes, muskegs and marshes, and Norton Sound. Main use of the watered segments however, occurs in winter when they are frozen over.

Criterion: National Scenic Trails should be of sufficient length to encompass and provide appropriate access to the resources which are a basis for the trail's designation.

Finding: The Seward-Nome route includes an aggregate of 2,037 miles of trail.

Criterion: National Scenic Trails should be continuous except where no practicable or feasible interconnection exists.

Finding: During winter, the principal season of use, the Seward-Nome route is continuous. In summer, water disconnects many segments, especially Norton Sound on the Kaltag-Nome leg.

Conclusions

The historic and recreational resources of the Seward-Nome route are found to be nationally significant and merit national recognition.

The rush to the Iditarod gold fields represented the last great gold stampede in North America. From all over the United States and even other countries, men and women traveled incredible distances to Alaska and then over wilderness trails to the gold fields. The Seward-Nome route forms a significant part of Alaska's and the Nation's frontier heritage.

The route is exceptional in that it was and is principally a winter route. Historic travel along the route took the path of least resistance, utilizing snow and ice to cross estuaries, lakes, rivers, marshes windfalls, hummocky terrain, and other obstacles along much of the route Due to these obstacles, summer travel was and is extremely difficult, if not impossible, over many segments.

The route is unique in that it is the only major trail system still used by dog mushers. The Iditarod Trail Race has been held annually since 1973 over a 1,049-mile segment from Anchorage to Nome. It commemorates dogsled travel as a unique aspect of Alaskan history. This race has, in a few years, become a major Alaskan spectator event and has attracted national publicity. The race route deviates substantially in places from the main Seward-Nome route, but utilizes other historic travel routes.

Several portions of the route possess high recreational values. The segments near Anchorage over Crow Pass, Indian Creek Pass, the Bench Lake Trail, and the segment west of Knik are currently receiving hiking, cross-country skiing, dog mushing, and/or snowmachine use. The Rainy Pass segment and the Portage Pass area have excellent potential for hiking use although existing uses are relatively light.

Snowmachines are used over major portions of the historic route for transportation, subsistence activities, and recreational purposes, including breaking trail for the sled dog race.

Some segments receiving recreational use or having potential for recreational use or development may be degraded or lost from public ownership or use through land disposal or by conflicting land uses over the next several years unless formal dedication or designation of land along the route occurs.

Most of the route is currently in public ownership with the State of Alaska controlling the largest share of the total mileage. Approximately 300 miles of the route have been selected by Native corporations under the terms of the Alaska Native Claims Settlement Act.

Based upon a knowledge of the area and the Iditarod Trail's historic role, the trail appears to possess national historic significance. Key sites, structures, and objects dating from this historic period must be identified and preserved before they are lost forever.

Together, the historical environment, the complementing assemblage of historic sites and structures, and continuing uses reminiscent of historic ones along the Iditarod Trail form a resource of national significance.

Recommendations

The entire Seward-Nome route--including appropriate branch, alternate, and Iditarod sled dog race routes--and related sites should be designated as a National Historic Trail within the National Trails System. The importance of its role in Alaskan history and the remaining historical values and growing public interest and use support this action. The designated route should include the frozen surfaces of those estuaries, lakes, and rivers, such as the Yukon, that are overlain by the route as well as roadways and railroads that overlay the route. The legislation designating the trail should include provisions for acquisition, retention, or dedication of significant historic sites, and for a right-of-way or easement along most or all of the route to protect historic values and segments for potential future recreational trail development and to insure continued public travel along the various segments.

Because construction of a summer trail over much of the route would be extremely expensive and impractical due to the great distances involved and the remoteness from population centers, it should not be attempted at this time. However, selected segments could be developed for summer use if the demand warrants such action.

Customary existing off-road vehicle use along the various segments should continue to be permitted. The manager of a particular segment should carefully regulate off-road vehicular use in order to protect environmental values and prevent conflicts among trail users.

As recreation needs increase in Alaska, consideration should be given to signing, improvement, and/or extension of existing public recreational trails along the route. Historic preservation law requires that the land areas affected by trail designation be surveyed for cultural resources so that a knowledge of these resources and requirements for their preservation may govern planning. A careful study of the route's archeological, historical, and recreational resources; development of an overall management and protection plan for the route; and stabilization of significant historic buildings or sites along the route should be undertaken during the initial planning following designation. Some historic sites, buildings, implements, and other resources found along the route will be imperiled over the next several years unless protected by some coordinated management program.

Inclusion of the route and related sites on the National Register of Historic Places should continue to be pursued by the Bureau of Land Management and the State.

The Bureau of Land Management should be designated as the overall Federal administrator to coordinate planning and actions to be taken along the entire route, and to manage those segments located on public domain lands. The various State and Federal, and possibly local, agencies should manage those segments traversing lands under their ownership or charge. Those route segments protected by public easements through private lands should be managed by the public agency having paramount land management responsibility in the area.

COSTS

During the foreseeable future, most use of the various trail segments would continue to be in winter when the trails are frozen over and covered with snow. Therefore, little or no conventional trail development or maintenance would be required. None is proposed on Federal lands at this time.

The only acquisition proposed is for a 25-foot wide, 1-1/2-mile long corridor in the Knik area which is now in private ownership. Such acquisition is needed to insure availability of a continuous trail for public use along this segment of the historic route. Otherwise, virtually the entire route is already in public ownership. The cost of acquiring the approximately 5 acres involved is estimated to be $35,000.

Another cost which the Federal government should incur would be to uniformly mark the trail with signs at approximately 25 highway crossings and other key points. The cost is estimated to be $2,500.

The major Federal cost would be to determine the precise location of the various trails and to locate and inventory the condition of the historic sites and structures along the trails. The cost of such a study by the Bureau of Land Management is estimated to be $100,000.

Responsibilities of the land management agencies for identification, preservation, and protection of National Register caliber properties are not affected by this proposal. These responsibilities stem from the National Historic Preservation Act of 1966 and E.O. 11593 of April 1971. However, it can be assumed that historic resources associated with the National Historic Trail would be highlighted by designation and that coordinating and preservation/protection programs would be emphasized by the managing agencies. Therefore, indirectly, the National Historic Trail designation could result in increased preservation activities along the trail.

Future management of those segments of the trail adaptable to summer recreation use would be the responsibility of the political jurisdiction involved. Most use would be on non-Federal lands in the Anchorage area. The Governor and State Legislature both have endorsed this concept and recommendations. The need for additional trail development for summer use on Federal lands is minimal at this time and would not be undertaken until a sufficient demand materializes and studies of appropriate segments have been completed.

Overall management coordination of the route by the Bureau of Land Management would most likely involve the assignment of one person full time at an estimated cost of approximately $50,000 annually.

ENVIRONMENTAL IMPACT

The Bureau of Outdoor Recreation has determined that the proposed action would not result in a major Federal action significantly affecting the quality of the natural and human environment within the meaning of Section 102(2)(C) of the National Environmental Policy Act. Principal use of the trail will occur during the winter months when the trail is covered with snow and ice. Little use in addition to what is already occurring is expected because of the extreme rigors involved along the trail during the primary season of use. Therefore, in accord with the applicable Council on Environmental Quality Guidelines, a Negative Declaration has been prepared. An Environmental Assessment is filed with the Bureau of Outdoor Recreation to support this Negative Declaration.

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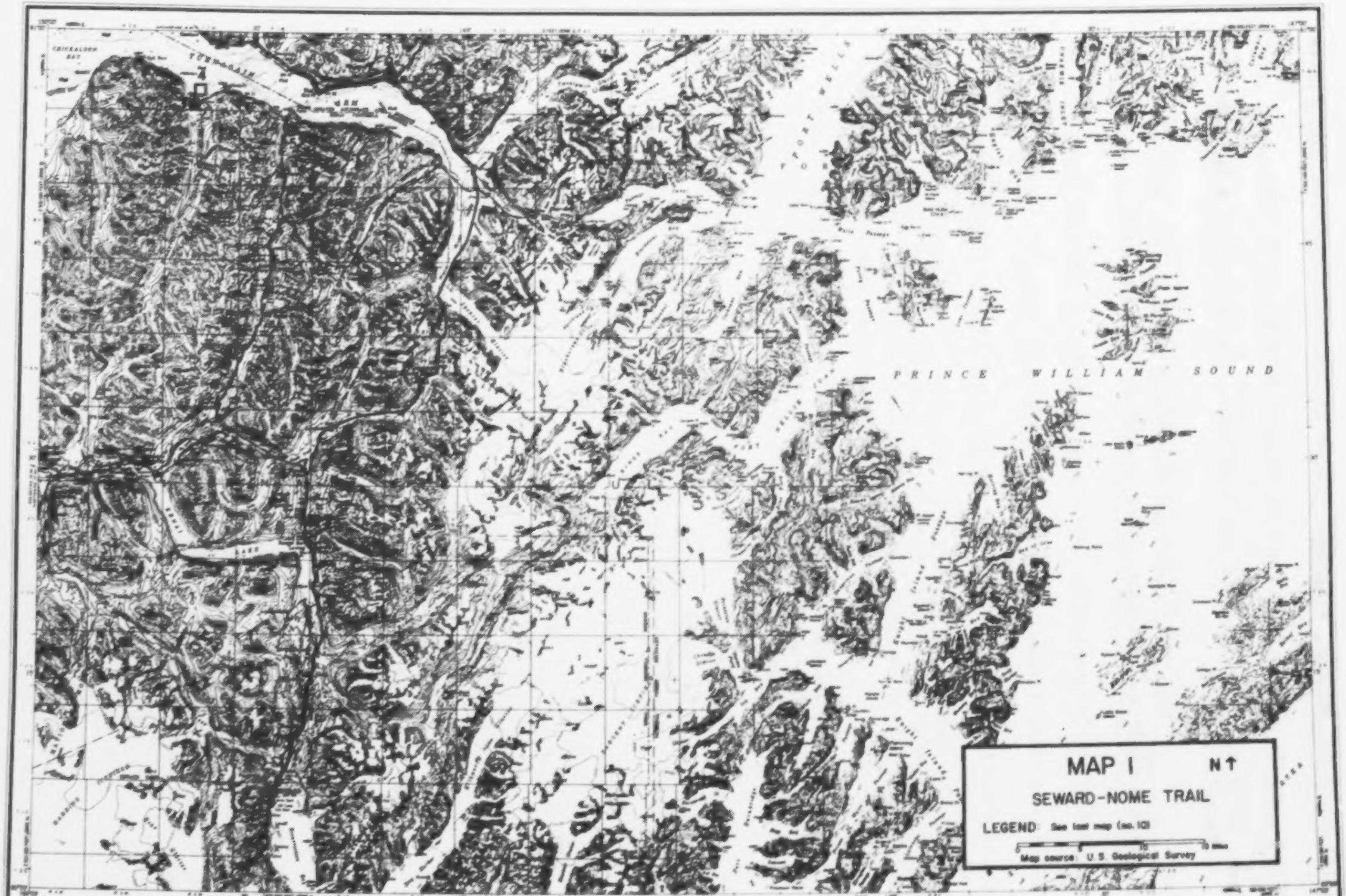


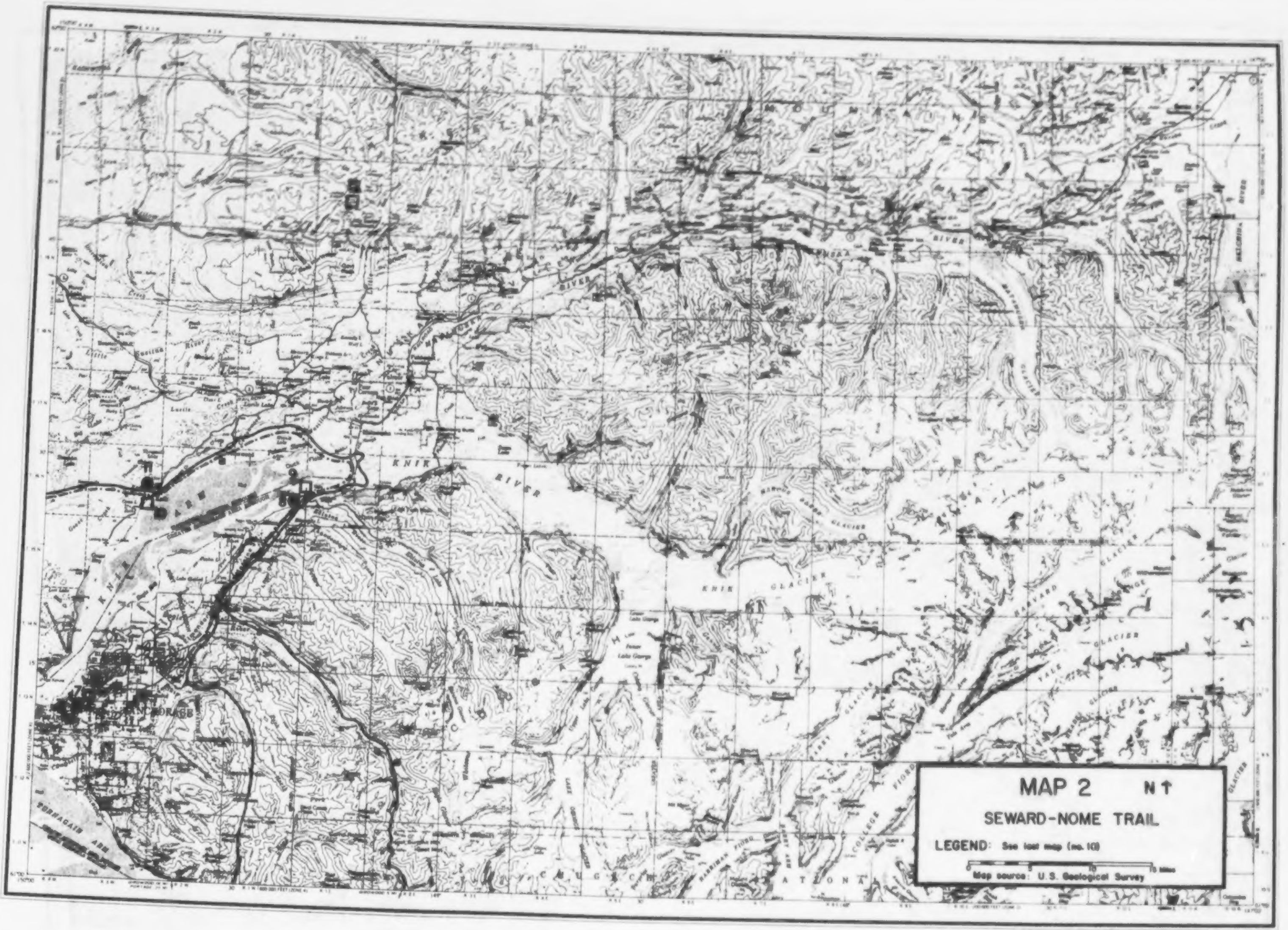
MAP I N↑

SEWARD-NOME TRAIL

LEGEND: See last map (no. 10)

Map source: U.S. Geological Survey

0
10
20 Miles
PRINCE WILLIAM SOUND
PORT WELLS
TURNAGAIN ARM
CHICKALOON BAY



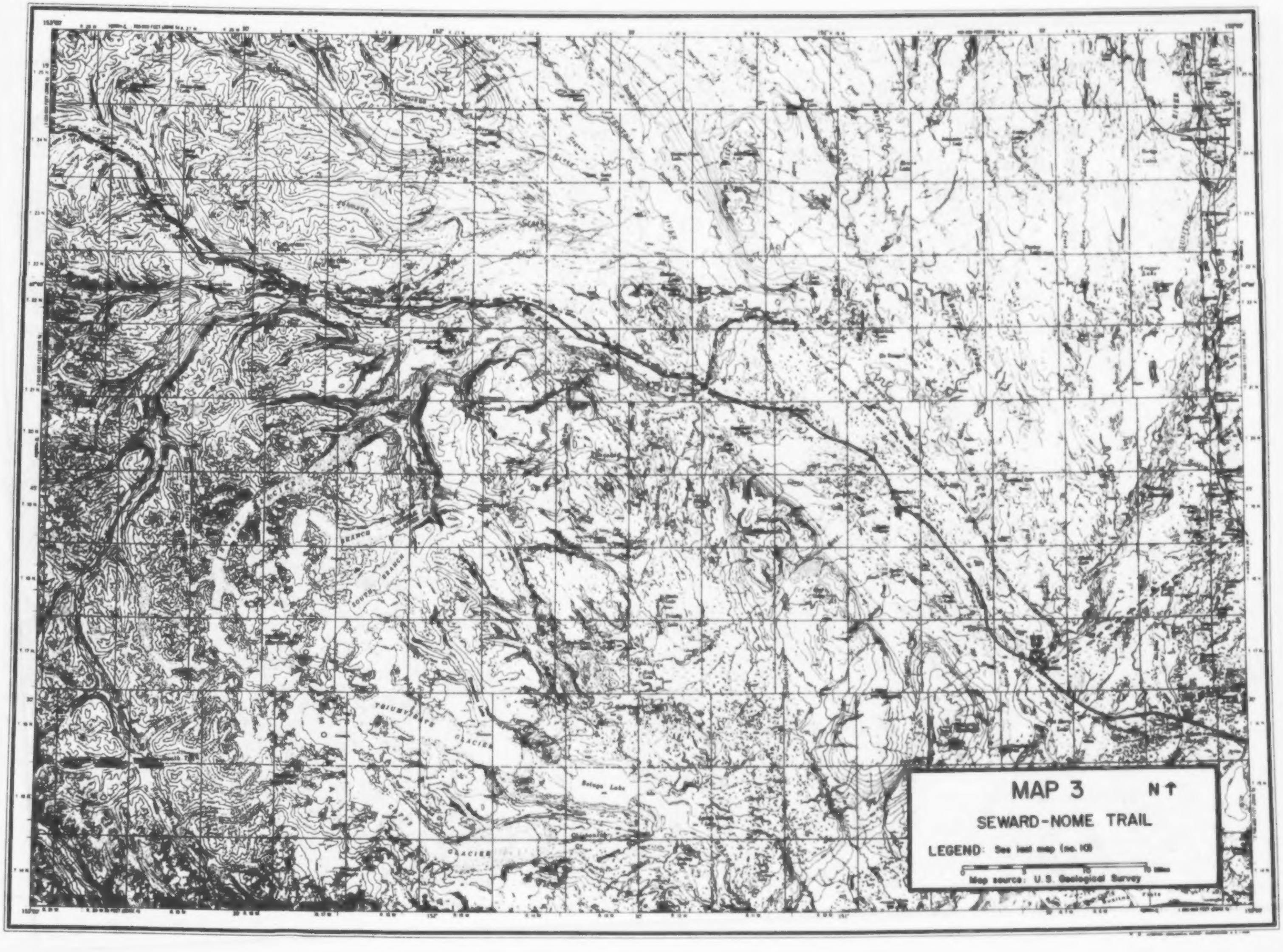
MAP 2 N↑

SEWARD-NOME TRAIL

LEGEND: See last map (no. 10)

Map source: U.S. Geological Survey

5 Miles
KNIK RIVER
KNIK GLACIER
KNIK ARM
MATANUSKA RIVER
MATANUSKA GLACIER
TURNAGAIN ARM
ANCHORAGE
HARRIMAN FIORD
COLLEGE FIORD
LAKE GEORGE
CHUGACH MOUNTAINS



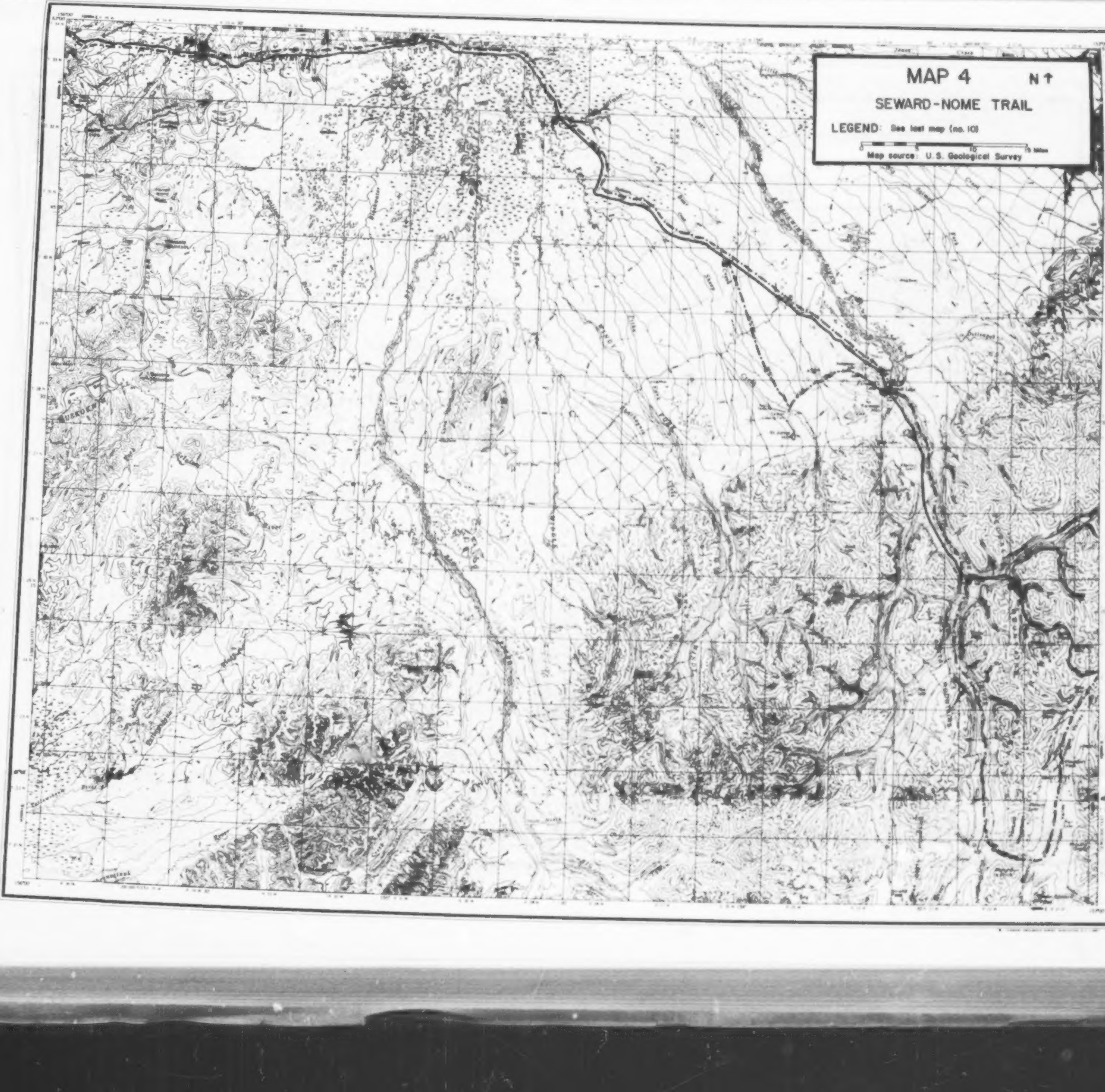
MAP 3 N↑

SEWARD-NOME TRAIL

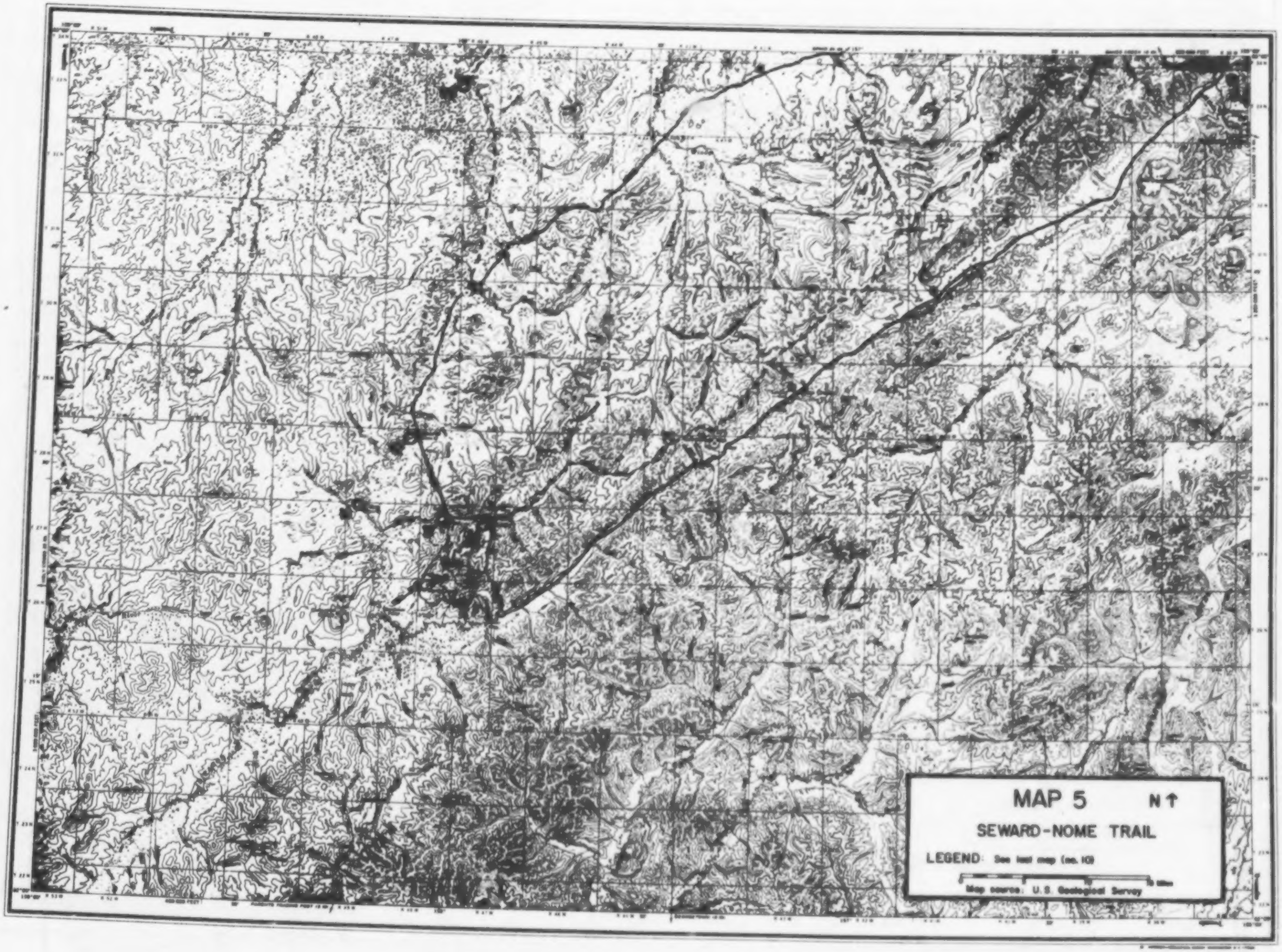
LEGEND: See last map (no. 10)

Map source: U.S. Geological Survey

0
5
10
15 Miles
SOUTH FORK
TRIUMVIRATE GLACIER
Beluga Lake
CAPPS GLACIER



MAP 4
N ↑
SEWARD-NOME TRAIL
LEGEND: See last map (no. 10)
0 5 10 15 Miles
Map source: U.S. Geological Survey

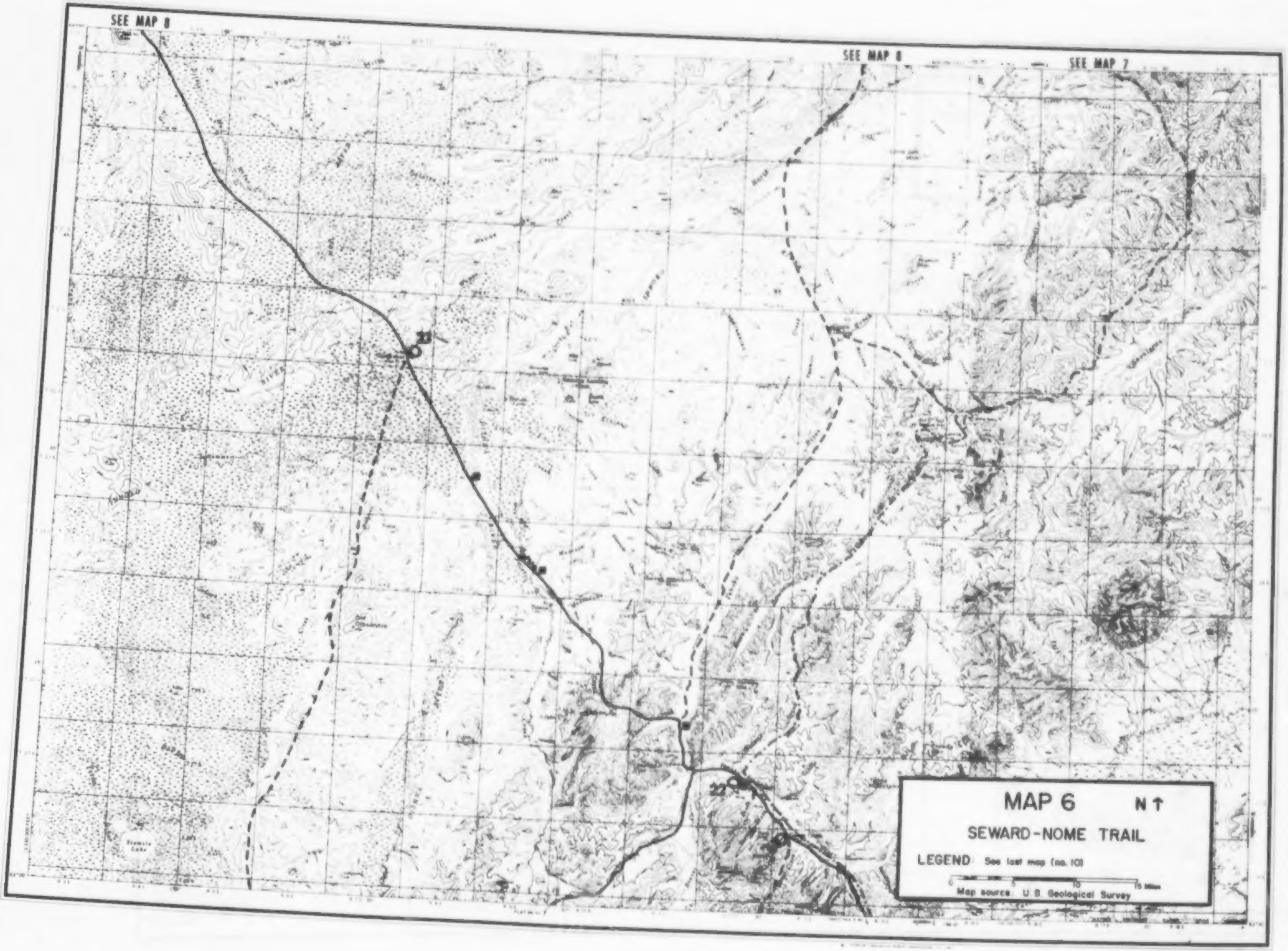


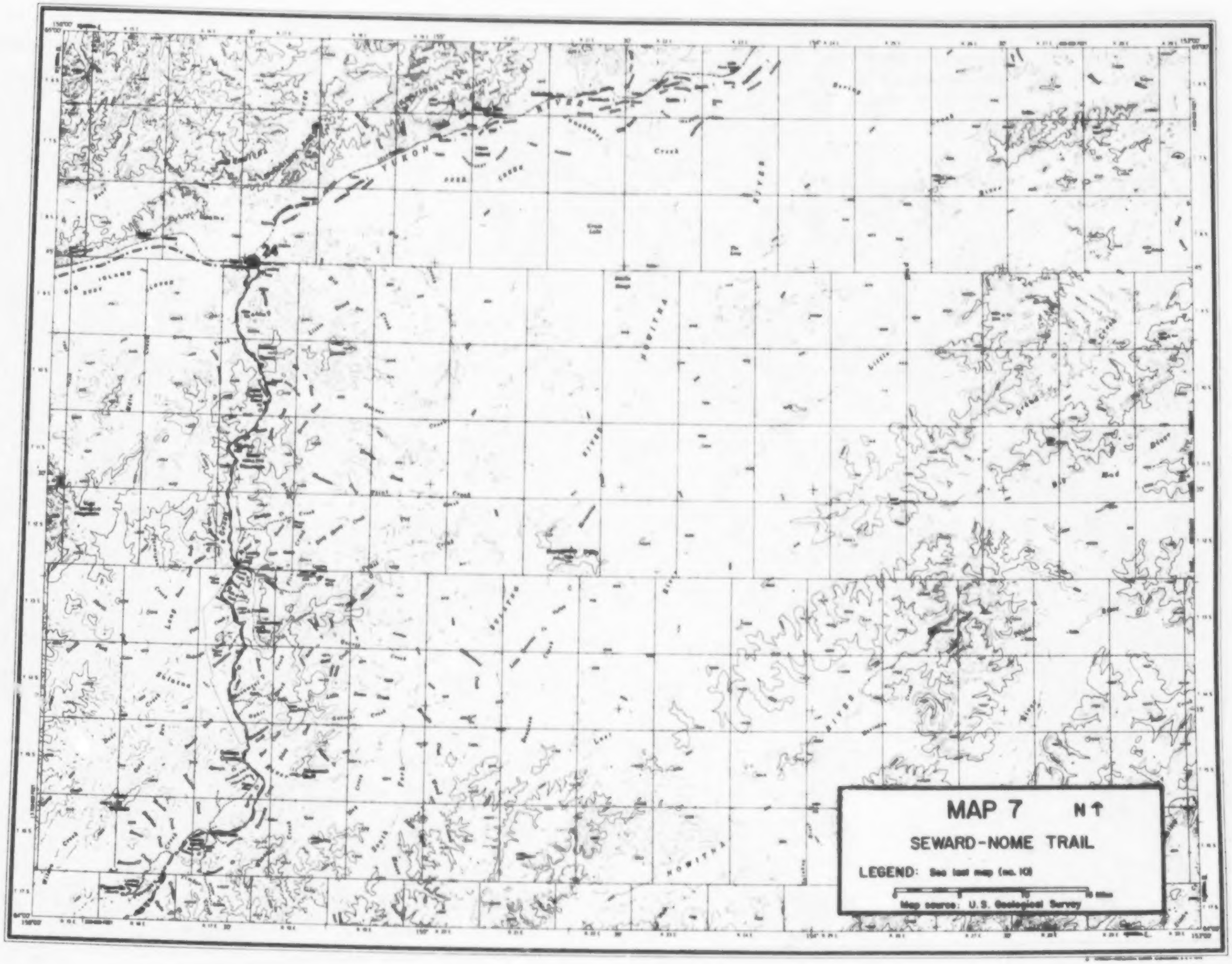
MAP 5 N ↑

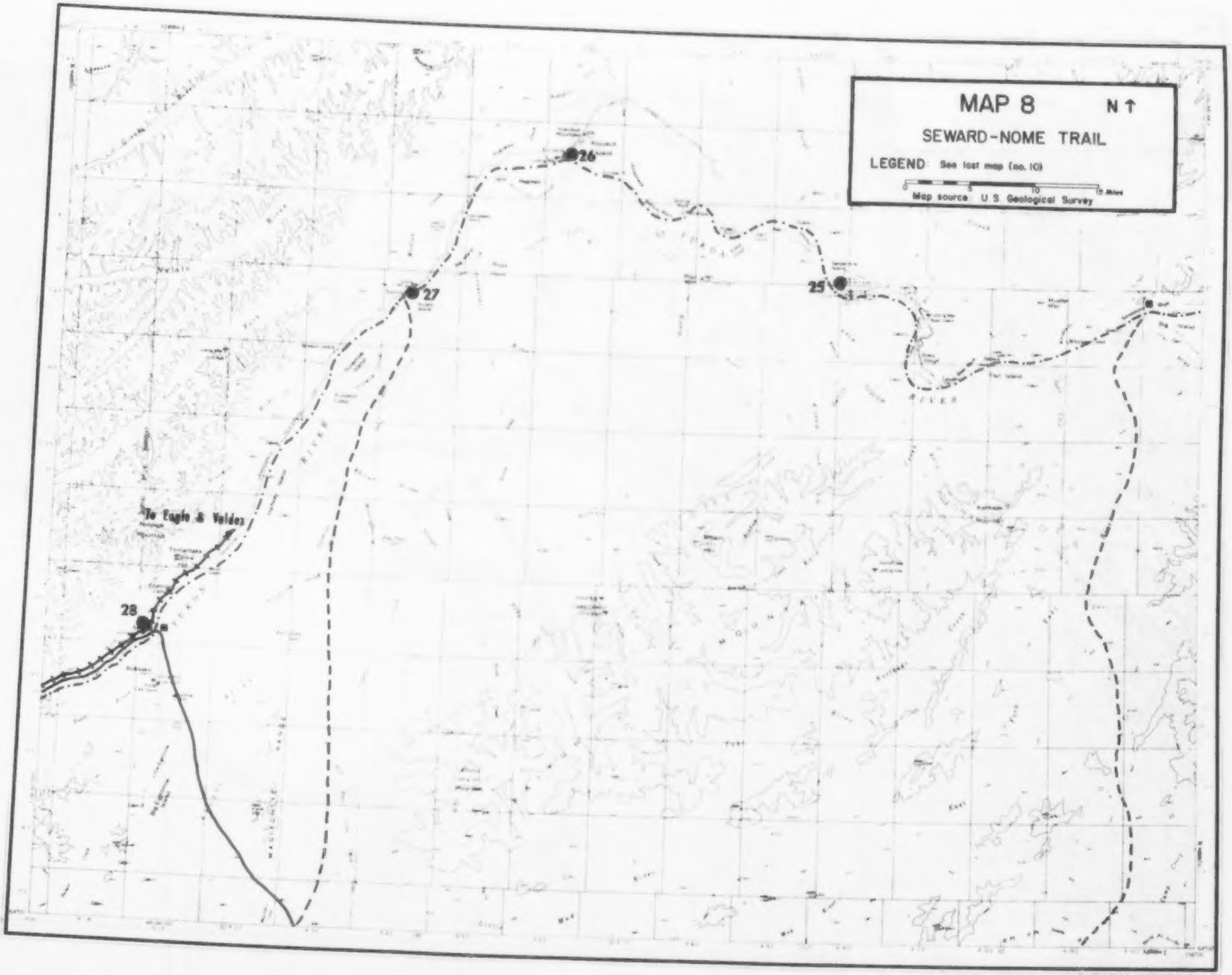
SEWARD-NOME TRAIL

LEGEND: See last map (no. 10)

Map source: U.S. Geological Survey


SEE MAP 8
SEE MAP 8
SEE MAP 7
23
22
MAP 6
N ↑
SEWARD-NOME TRAIL
LEGEND: See last map (no. 10)
0
5
10
15 Miles
Map source: U.S. Geological Survey


MAP 7 N↑
SEWARD-NOME TRAIL
LEGEND: See last map (no. 10)
Map source: U.S. Geological Survey
YUKON RIVER
NOWITNA
24



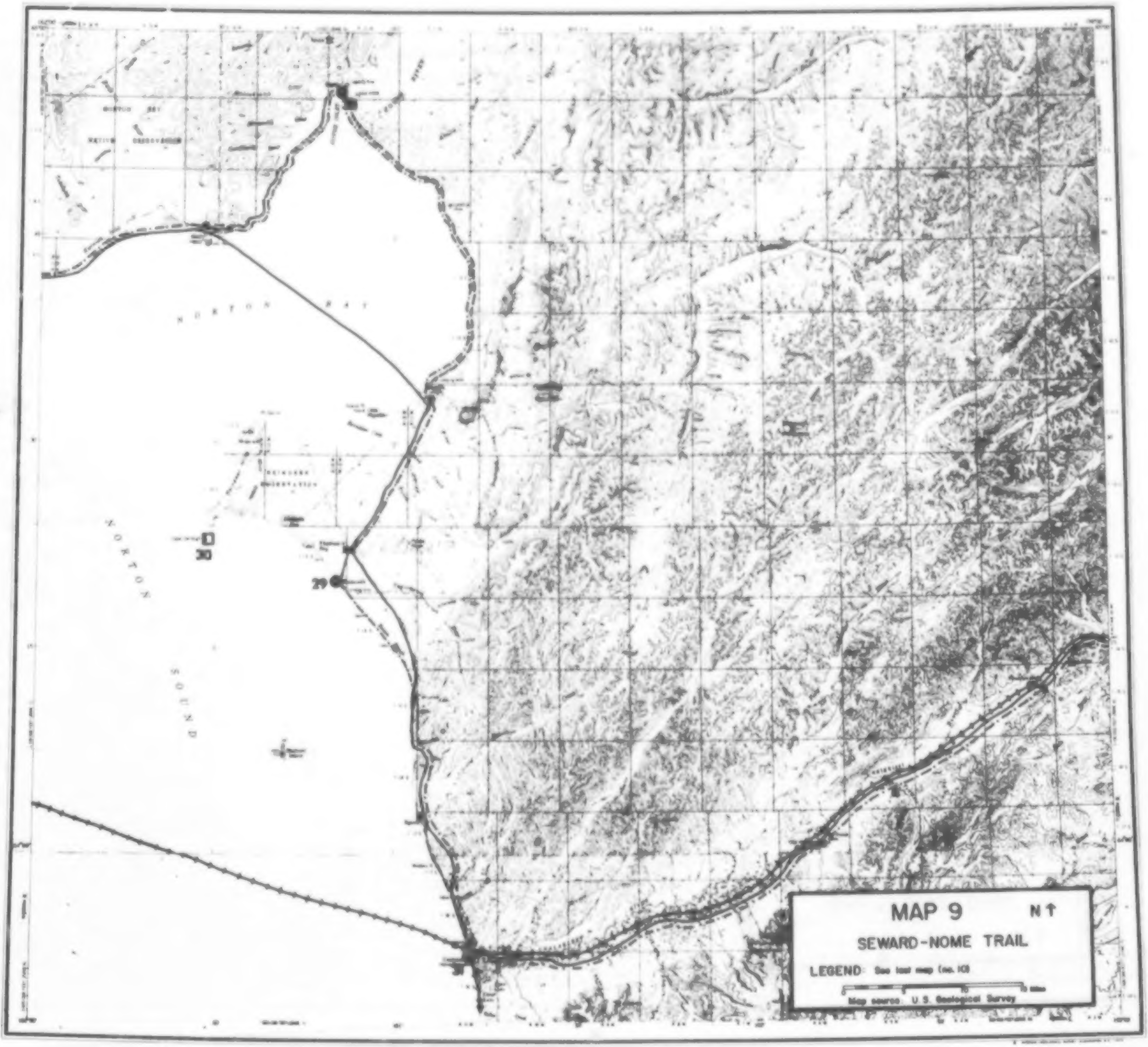
MAP 8 N↑

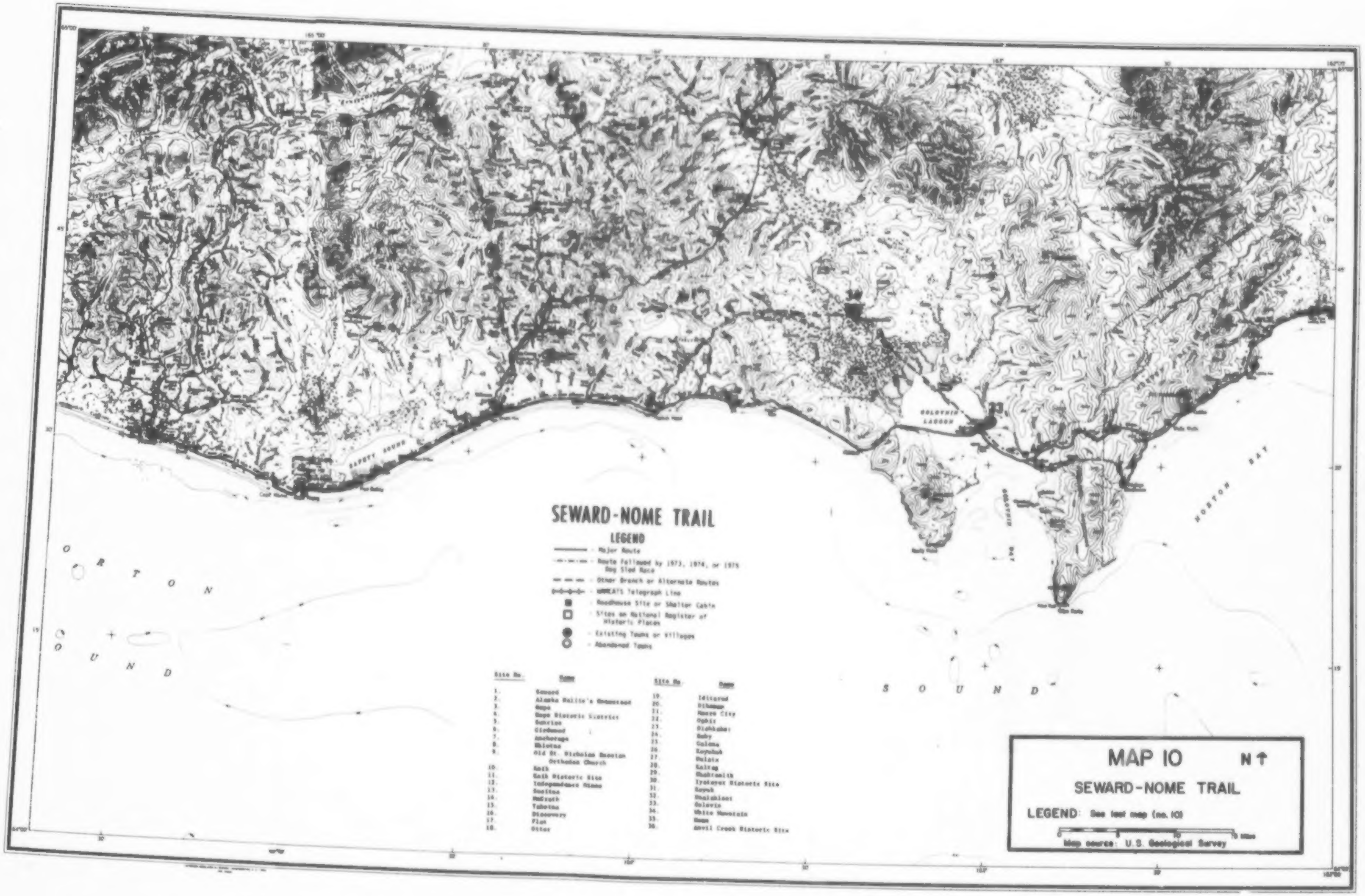
SEWARD-NOME TRAIL

LEGEND: See last map (no. 10)

Map source: U.S. Geological Survey

0
5
10
15 Miles
25
26
27
28
To Eagle & Valdez
RIVER
RIVER


MAP 9
N ↑
SEWARD-NOME TRAIL
LEGEND: See last map (no. 10)
Map source: U.S. Geological Survey
NORTON BAY
NORTON SOUND
29
30


SEWARD-NOME TRAIL
LEGEND
Major Route
Route Followed by 1973, 1974, or 1975 Dog Sled Race
Other Branch or Alternate Routes
WAMCATS Telegraph Line
Roadhouse Site or Shelter Cabin
Sites on National Register of Historic Places
Existing Towns or Villages
Abandoned Towns
Site No. Name
1. Seward
2. Alaska Nellie's Homestead
3. Hope
4. Hope Historic District
5. Sunrise
6. Girdwood
7. Anchorage
8. Eklutna
9. Old St. Nicholas Russian Orthodox Church
10. Knik
11. Knik Historic Site
12. Independence Mine
13. Susitna
14. McGrath
15. Takotna
16. Discovery
17. Flat
18. Otter
19. Iditarod
20. Dikeman
21. Moose City
22. Ophir
23. Dishkaket
24. Ruby
25. Galena
26. Koyukuk
27. Nulato
28. Kaltag
29. Shaktoolik
30. Iyatayet Historic Site
31. Koyuk
32. Unalakleet
33. Golovin
34. White Mountain
35. Nome
36. Anvil Creek Historic Site
NORTON SOUND
SAFETY SOUND
GOLOVNIN LAGOON
GOLOVNIN BAY
NORTON BAY
33

MAP 10 N↑

SEWARD-NOME TRAIL

LEGEND: See last map (no. 10)

Map source: U.S. Geological Survey

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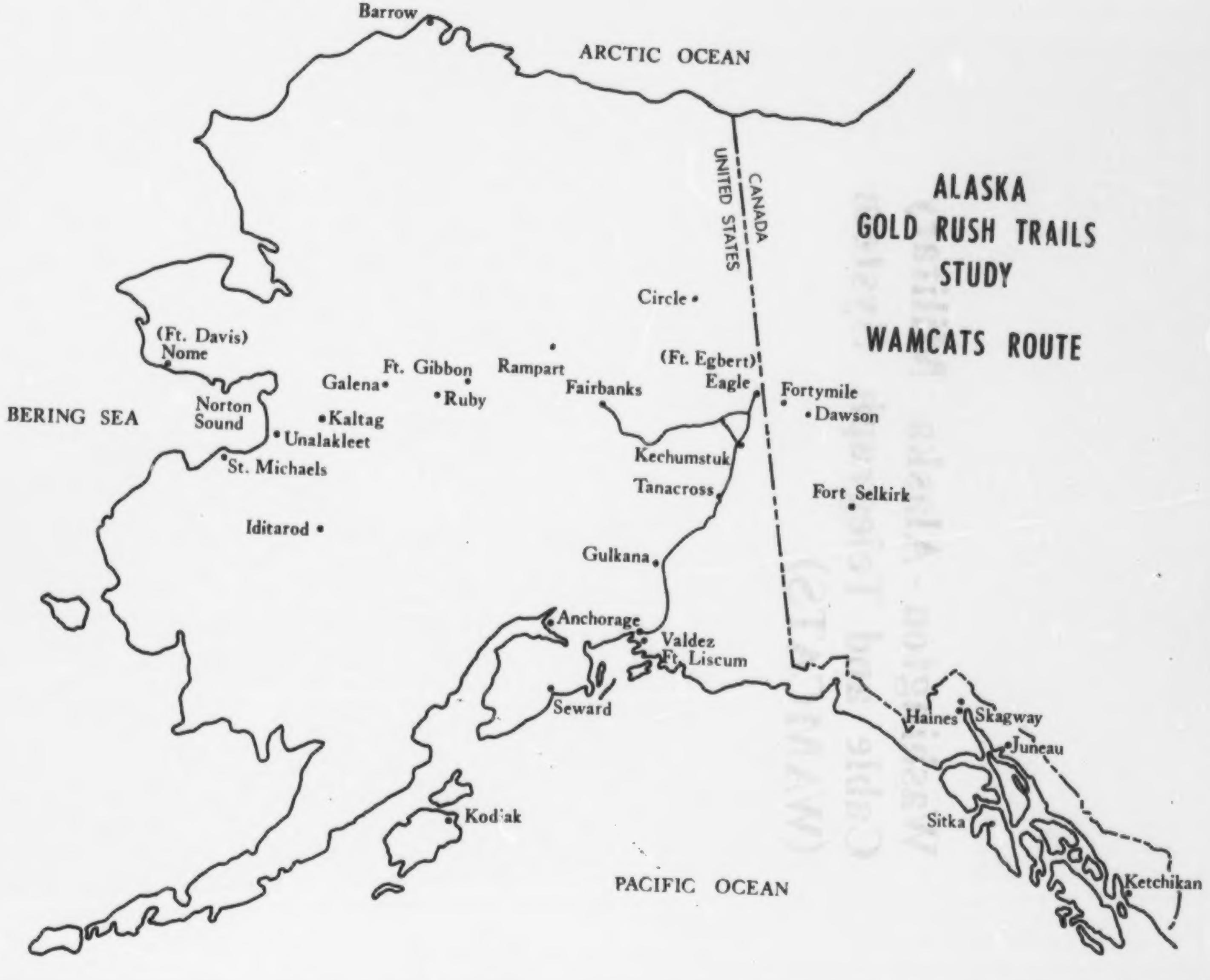
Washington - Alaska Military Cable and Telegraph System (WAMCATS)

ALASKA
GOLD RUSH TRAILS
STUDY

WAMCATS ROUTE


Barrow
ARCTIC OCEAN
CANADA
UNITED STATES
Circle
(Ft. Davis)
Nome
Ft. Gibbon
Rampart
(Ft. Egbert)
Eagle
Fortymile
Dawson
Galena
Ruby
Fairbanks
BERING SEA
Norton
Sound
Kaltag
Unalakleet
St. Michaels
Kechumstuk
Tanacross
Fort Selkirk
Iditarod
Gulkana
Anchorage
Valdez
Ft. Liscum
Seward
Haines
Skagway
Juneau
Sitka
Kodiak
PACIFIC OCEAN
Ketchikan

WASHINGTON-ALASKA MILITARY CABLE AND TELEGRAPH SYSTEM (WAMCATS)

BACKGROUND

With the influx of thousands of miners to Alaskan and Canadian gold fields, the need for a reliable, speedy means of communication with the outside became paramount in the late 1890's. To send a message from the interior of Alaska to Washington, D. C., and receive a reply generally required a year's time. Accordingly, on May 26, 1900, the Congress authorized the War Department, which administered Alaska, to begin construction of a system of telegraph lines and submarine cables which would interconnect all of Alaska's military posts and tie in directly with the rest of the United States and Washington, D. C.

The telegraph portion of the network was completed in 1903. Initially, the network tied in with a line extending south through Canada by way of Dawson and Vancouver. However, in 1904, a submarine cable connecting Seattle and Ft. Liscum was completed, thus eliminating the necessity for transmitting all messages from Alaska through Canada.

By 1906, some 2,347 miles of submarine cable, 1,375 miles of land line, and a 107-mile wireless link across Norton Sound comprised the WAMCATS network. The estimated costs were $1,144,907 for the submarine cable, $848,375 for land lines, and $32,700 for the wireless line.

LOCATION AND REGIONAL ENVIRONMENT

General Alignment

The telegraph line portion of WAMCATS comprised a total of 1,497 land miles. The two major segments extended between Kechumstuk, Fort Gibbon (Tanana), and St. Michaels in an east-west direction, and between Fort Egbert (Eagle) and Fort Liscum (Valdez) in a north-south direction. For this study, most of the mileage of these segments was inspected from the air. Portions were also examined on the ground. The line between the mouth of the Fortymile River in Canada and Eagle, and in the Fortymile drainage south from Eagle, was examined first-hand during field work for the Fortymile Wild and Scenic River study. The Bureau of Land Management has also evaluated much of the line between Eagle and Valdez.

Length

Three segments (376 miles) of the land-based line were determined to have the best potential for recreational use and historic interpretation due to terrain conditions, accessibility, and the existence of historical remnants. See the map on page 87. They are:

pages tightly bound

best copy available

Fort Egbert to Slana	220 miles
Kechumstuk to the Richardson Highway in the vicinity of Quartz Lake	145 miles
Fort Egbert to Dawson	11 miles in Alaska, plus approximately 100 miles in Canada

A fourth section comprising approximately 20 miles south of Tonsina through Kimball Pass is discussed under the Valdez-Fairbanks Trail. A fifth section comprising some 95 miles between Unalakleet and Kaltag is discussed under the Iditarod Trail.

Regional Climate, Topography, Vegetation, and Wildlife

The climate associated with the Eagle area is characterized by severe winters and mild summers with long hours of daylight. During the winter, extended periods with temperatures at or below -35°F are common. Periods where the temperature drops to -50°F are not unusual. Generally the winters are noted for the lack of wind, hence the wind chill factor is not as serious as in other parts of Alaska. Summers are warm with temperatures reaching 70°F and occasionally 90°F. Freezing temperatures may occur during any month. Thunderstorms are common and normally localized.

Topography is varied, ranging from the gently rolling hills of the Yukon-Tanana Upland immediately south of Eagle, to narrow river and stream valleys, to the extensive flood plain of the Tanana River. A major muskeg area is found in the Mosquito Flats area along the Fortymile River. Elevation ranges from less than 1,000 feet at Eagle, to 4,000 feet in the Fortymile drainage, to 1,500 feet in the Tanana Valley, to almost 4,000 feet in Indian Pass just north of Slana.

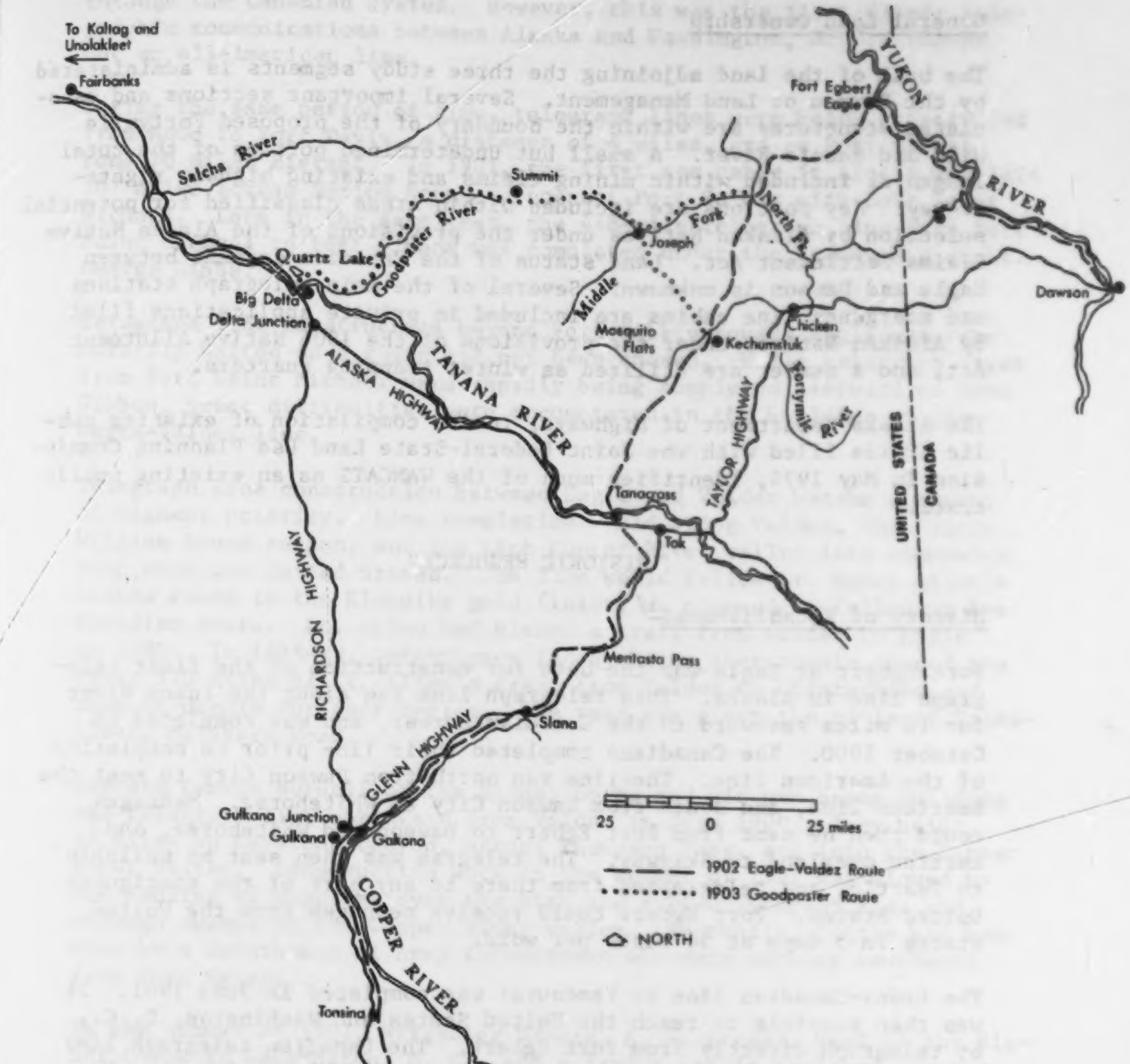
Vegetation is variable, ranging from alpine tundra to mixed spruce-birch forests along the water courses.

A wide range of wildlife species-including moose, wolf, caribou, grizzly and black bear, the lesser mammals, and birds--occur in relative abundance.

Land Uses and Access

Overall land use in the area is associated with mining, hunting, fishing, and trapping. Major communities are Eagle, Big Delta, Tanacross, and Mentasta Lake.

Public access to segments of the line is possible from the Glenn, Richardson, and Taylor Highways. The line north of the Alaska Highway is not readily accessible.



To Kaltag and Unalakleet
Fairbanks
Salcha River
Summit
Goodpaster River
Quartz Lake
Big Delta
Delta Junction
Middle Fork
Joseph
North Fk.
Fort Egbert
Eagle
YUKON RIVER
Dawson
Chicken
Mosquito Flats
Kechumstuk
Fortymile River
TAYLOR HIGHWAY
UNITED STATES
CANADA
ALASKA HIGHWAY
TANANA RIVER
Tanacross
Tok
RICHARDSON HIGHWAY
Mentasta Pass
Slana
GLENN HIGHWAY
Gulkana Junction
Gulkana
Gakona
COPPER RIVER
Tonsina
Valdez
Fort Liscum
Thompson Pass
25 0 25 miles
1902 Eagle-Valdez Route
1903 Goodpaster Route
NORTH

WAMCATS

WASHINGTON - ALASKA MILITARY CABLE AND TELEGRAPH SYSTEM

General Land Ownership

The bulk of the land adjoining the three study segments is administered by the Bureau of Land Management. Several important sections and associated structures are within the boundary of the proposed Fortymile Wild and Scenic River. A small but undetermined portion of the total length is included within mining claims and existing highway rights-of-way. Key portions are included within areas classified for potential selection by Alaskan Natives under the provisions of the Alaska Native Claims Settlement Act. Land status of the Canadian segment between Eagle and Dawson is unknown. Several of the main telegraph stations and emergency line cabins are included in private applications filed by Alaskan Natives under the provisions of the 1906 Native Allotment Act, and a number are utilized as winter trapping quarters.

The Alaska Department of Highways, in its compilation of existing public trails filed with the Joint Federal-State Land Use Planning Commission in May 1974, identifies much of the WAMCATS as an existing public trail.

HISTORIC RESOURCES

History of Establishment[1]

Fort Egbert at Eagle was the base for construction of the first telegraph line in Alaska. This telegraph line ran along the Yukon River for 12 miles eastward to the Canadian Border, and was completed in October 1900. The Canadians completed their line prior to completion of the American line. The line ran north from Dawson City to meet the American line, and south from Dawson City to Whitehorse. Messages could then be sent from Fort Egbert to Dawson and Whitehorse, and carried overland to Skagway. The telegram was then sent by mailship to Seattle, and telegraphed from there to any part of the contiguous United States. Fort Egbert could receive messages from the United States in 5 days at 56 cents per word.

The trans-Canadian line to Vancouver was completed in June 1901. It was then possible to reach the United States and Washington, D. C., by telegraph directly from Fort Egbert. The Canadian telegraph line was poor throughout its operation, and undependable as line breaks were common. Also it was often difficult to get messages sent promptly through the Canadian system. However, this was the first direct telegraphic communications between Alaska and Washington, D. C., though not an all-American line.

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[1] The following account was taken almost verbatim from a report by William A. Quirk, III, Historical Aspects of the Building of the Washington, D. C.-Alaska Military Cable and Telegraph System, with Special Emphasis on the Eagle-Valdez and Goodpaster Telegraph Lines, 1902-1903, Bureau of Land Management, Fairbanks District Office, May 1974.

During the same period of time, telegraph lines were being constructed from Nome to Fort Davis, a distance of 4 miles, and to Port Safety some 20 miles distant. In 1901, the first sea cable in Alaska was laid 107 miles across Norton Sound to connect Port Safety with Fort Saint Michael. Late in the same year, the 448-mile telegraph line from Fort Saint Michael to Fort Gibbon was completed under the leadership of Lt. George Gibbs.

Telegraph line construction beyond Fort Gibbon toward Eagle was temporarily halted as a route had not been chosen. While telegraph lines from Fort Saint Michael were rapidly being completed eastward to Fort Gibbon, great difficulties were encountered in the building of the Eagle-Valdez line.

Telegraph line construction between Eagle and Valdez became a matter of highest priority. Line completion would bring Valdez, the Prince William Sound region, and the rich Copper River valley into communication with the United States. The line would follow Lt. Henry Allen's Alaska route to the Klondike gold fields, as opposed to following the Canadian route. Lt. Allen had blazed a trail from Valdez to Eagle in 1885. In 1898-99, infantrymen led by Major Abercrombie opened the first 170 miles of Lt. Allen's trail from Valdez to Chistochina and made it usable for pack trains. The road was given the title of Trans-Alaska Military Road.

Captain George Burnell of the Signal Corps and his men began building the telegraph line northward from Valdez in July 1900. They built 37 miles up Keystone Canyon, across Thompson Pass, and into the Copper River valley. Construction work in the summer of 1901 was slowed by the hauling of supplies over the high and rugged Thompson Pass and through swamps in the Copper River valley. Meanwhile, little had been done by a detachment of Army infantrymen who were working southward from Fort Egbert.

In the summer of 1901, Brigadier General A. W. Greely, head of the Signal Corps in Washington, D. C., and a famous Arctic explorer, sent a 21-year-old first lieutenant named William Mitchell to Fort Egbert to investigate the delays in the Alaska telegraph line to the south. Lt. Mitchell (who later became famous as Brigadier General William "Billy" Mitchell of the Army Air Corps for his predictions on the role of air power in warfare) had learned military telegraph line construction while serving in the Philippine Insurrection. He had other military experience in the Spanish-American War.

Lt. Billy Mitchell made his base at Fort Egbert near Eagle for the next 2 years (1901-1903). During this time, he directed construction of the Eagle-Valdez line to the Tanana River, a distance of 153 miles, and directed the exploration and construction of some 204 miles of the Goodpaster line in very difficult terrain.

All stores and equipment--including foodstuffs, hay, oats, special sleds, harnesses, and transport animals (dogs, horses, and mules)--for the telegraph line came up the Yukon in summer by boat and were unloaded at Eagle.

During winter, horses and mules sledded foodstuffs, materials, and equipment from Fort Egbert over the snow and ice to field locations along the Eagle-Valdez line to Tanana Crossing (now Tanacross), a distance of 147 miles. Billy Mitchell set to work to establish the course of the new line. First the line was surveyed, next the right-of-way was chopped, then the wire was run over the snow.

Insulators, brackets, and nails were tied to the wire every quarter of a mile in sufficient quantities for the intervening distance. This was done because in summer, transport animals could not pack the wire and move camps in the same manner as in winter.

As summer 1902 approached, Mitchell's crew dug holes, placed poles in the ground, and elevated the wire at a record pace. On August 24, 1902, Mitchell completed the line to Tanana Crossing. He was met there by Captain George Burnell, who built the line from Valdez. Telegraphic messages could now be sent from Prince William Sound and Valdez through the Fortymile country to Eagle, then retelegraphed over the Canadian line to Vancouver and Seattle. Telegraphic communications from southeast Alaska funneled through Skagway and Whitehorse and down the Canadian line after a new submarine cable was laid from Juneau to Skagway in summer 1902. The remaining link needed was to connect Fort Gibbon and Baker with Eagle.

Preparations were being made in 1902 at Fort Egbert for the final work, the joining of the Fort Egbert-Fort Liscum line to the line from Fort Saint Michael, which at this time extended to Baker on the Tanana River.

Mitchell reconnoitered to determine where the line should be located. On January 1, 1903, he mushed from Eagle to the confluence of the Goodpaster and Tanana Rivers, thus discovering the route along the Goodpaster drainage.

Mitchell and his crew mushed back to Eagle, and he began mobilizing his men. They sledded some 300 tons of supplies 95 miles to the head of the Goodpaster River in preparation for building the line. Work was begun in both directions from this point (now called Summit Station); i.e., from Kechumstuk (the tapoff on the Eagle-Valdez line) to Summit, and from Summit to Big Delta. By the last of April 1903, the wire had been run for the entire distance from Kechumstuk to the mouth of the Goodpaster River. Mitchell expected to meet the party working up the Tanana River, but it had not been able to get within 65 miles of that point due to insurmountable obstacles.

Because the Federal appropriation for the Washington-Alaska Military Cable and Telegraph System ran out on June 30, 1903, Mitchell was determined to finish the last link in the line by that date.

Sufficient supplies and materials had been left at the Goodpaster River in the event the party working up the Tanana River did not reach Mitchell's working party. Mitchell's crew was ordered to build boats from whipsawed lumber at Central Station and, as soon as the ice on the Goodpaster River broke up, to move supplies down the river to the Tanana River. Pack trains were also sent to cooperate in hauling supplies down the Tanana River.

During the month of May, Mitchell's parties, with their pack trains, were working between Kechumstuk and the mouth of the Goodpaster River, putting in poles and elevating the wire. All stations had been chosen, and caches of rations for the working parties and forage for the animals were in place. In addition, a year's supplies for three men and one dog team were carried to each cache along the entire route for maintenance after the line was built.

Mitchell's parties had to reach the Salcha River, some 65 miles away, before the June 30 deadline, and the final run down the Tanana River began on May 31, 1903. Work progressed rapidly in spite of numerous obstacles and serious problems. The crews' meat ran out, but they obtained caribou and bear meat as substitutes. Mosquitoes were nearly intolerable for both men and animals, and long smoky fires were built to keep the insects away. Getting the boats through the Bates Rapids on the Tanana River took special care. On June 10, when the line was half finished, a forest fire more than 250 miles long burned in the direction of the line. After June 10, the men worked through the fire and, in some places, carried the wire through the smoking embers by galloping through on a mule.

On June 27, 1903, near the Salcha River, Lt. Mitchell met Lt. Gibbs, who was working up the Tanana River from Fairbanks and the final connection was made.

The Trans-Alaska Telegraph System comprised some 1,447 miles of overland lines and a few hundred miles of submarine cable. Telegraphic messages could be sent to Eagle from Nome and Fort Saint Michael on the Bering Sea; up the Yukon and Tanana Rivers to Fort Gibbon, then Fairbanks; and from Prince William Sound and Valdez. From Eagle, these messages were channeled through the Canadian line to Vancouver and Seattle, and on to Washington, D. C., and the rest of the United States.

All of the telegraph lines had been constructed in just 3 years, 1 month, and 1 day. The line builders faced tremendous hardships and difficulties. Supplying all materials over interior Alaska in winter by sledding or pack animals, over the roughest, most primitive trails in undeveloped country, was a tremendous task in itself. The work was led by Captain George Burnell and Lts. William Mitchell and George Gibbs, and, at various times, by the 3rd, 7th, 8th, 10th, and 13th Infantries.

Wire, insulators, brackets, nails, foodstuffs, hay, oats, and other supplies were often transported long distances. All supplies and equipment for the 428-mile Eagle-Valdez Telegraph Line were hauled 168 miles south from Eagle or 260 miles north from Valdez to Tanana Crossing. In constructing the Goodpaster Telegraph Line, Mitchell's crew transported supplies 273 miles from Eagle.

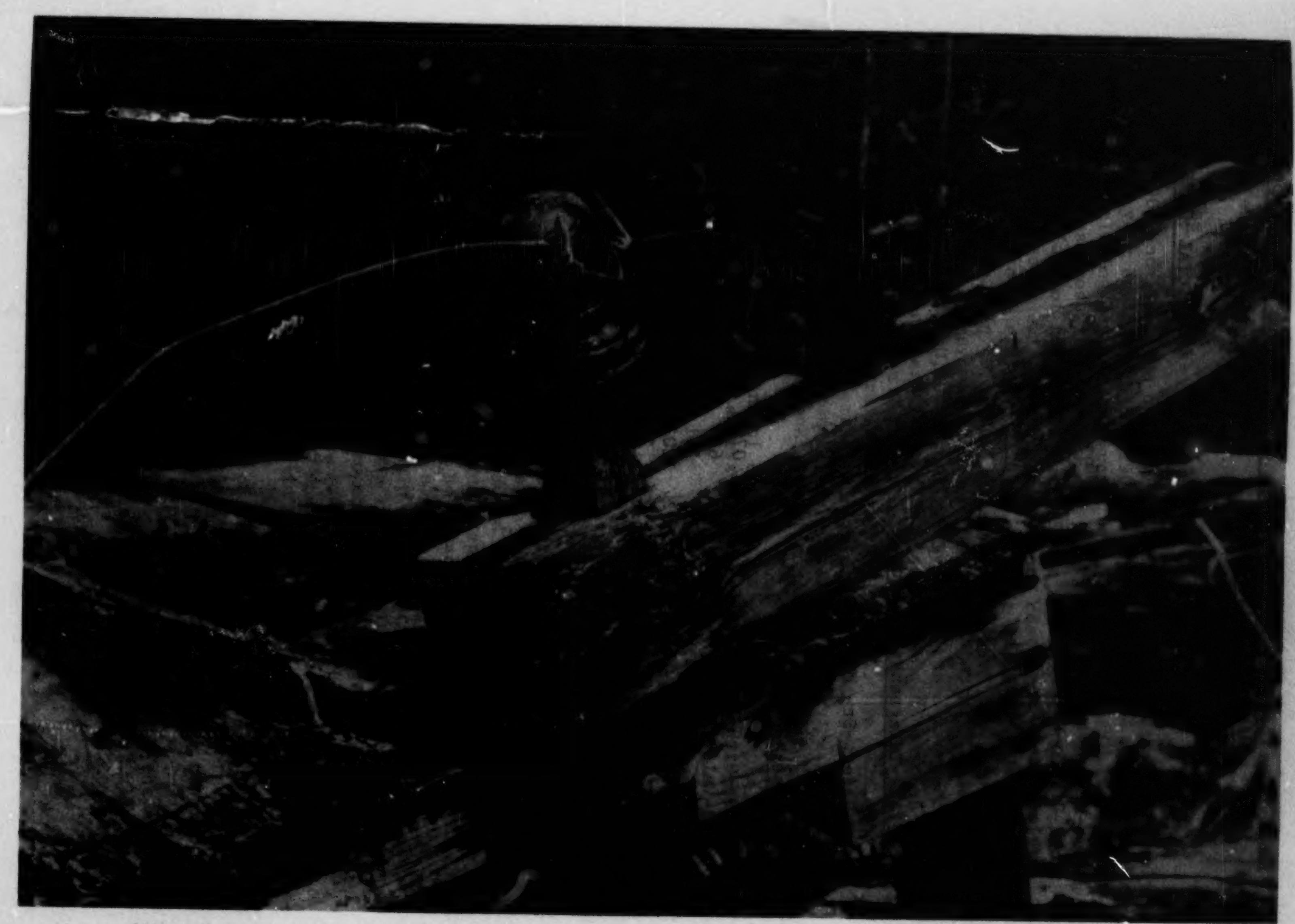
In 1903, Congress appropriated funds for the construction of submarine cables from Juneau to Sitka and from Sitka to Seattle, a total distance of 1,377 miles. It was not until 1904 that these lines were completed. Another appropriation in April 1904 provided for construction of a cable from Sitka to Valdez, a distance of 600 miles. This line was laid in the Gulf of Alaska and was completed in October 1904, thus completing an all-American line of telegraph communications.

The original submarine cable laid in Norton Sound in 1901 was ruptured when the ice went out in the summer 1902. After private companies gave up, the Signal Corps continued to work on wireless radio across the Norton Sound. In August 1903, Captain Wildman succeeded in making contact with St. Michael from Port Safety, 107 miles away. This achievement represented the first long distance wireless telegraphy in the United States.

Military records indicate land lines in Alaska were estimated to have cost the government $617 per mile, while submarine cables cost $452 per mile. Annual maintenance of these telegraph lines cost $6.25 per mile. During one of the early years, there were more than 200 interruptions of telegraph service with causes divided almost equally among blizzards, forest fires, sleet storms, high winds, and vandalism.

The line was maintained by detachments of soldiers stationed at log cabins every 40 miles. Each detachment was made up of one Signal Corps repairman and two assistants from the Army. A sled and dog team of seven dogs were used for winter transportation. Relief cabins for shelter from the frequent blizzards were located between the repair cabins. When service over the line was broken, a repairman and infantryman started out from the cabins on each side of the break. The first man to reach the fault made repairs and awaited the arrival of the other party. After contact was established, both crews returned to their stations.

By September 1910, there were some 1,506 miles of land lines, 2,630 miles of submarine cables, and wireless telegraphy covering 934 miles.



Old telegraph station still remaining in Forty Mile River area. (Bureau of Outdoor Recreation)

TABLE IV. The Land Line, Wireless, and Submarine Cable Components of WAMCATS in 1904

	MILES	TOTAL MILES
Land Lines		
Nome-Kechumstuk	933	
Fort Gibbon-Baker	125	
Eagle-Valdez	428	
Fort Egbert-Boundary	11	
Total Land Telegraph Lines		1,497
Wireless Telegraphy (Radio)		
Port Safety-St. Michael		107
Submarine Cable		
Seattle-Sitka	1,070	
Sitka-Valdez	640	
Sitka-Juneau	291	
Juneau-Fort Seward (Haines)	102	
Fort Seward-Skagway	21	
Total Submarine Cable		2,124
Total Mileage in WAMCATS		3,728

At that time, wireless telegraphy began to supplant the land and sea cable system.

Period of Use

Between 1903 and 1910, the original WAMCATS system performed most ably. During the year ending June 30, 1906, a total of 306,454 messages were handled, including 253,338 commercial and 53,116 military. Even until 1921, most messages within Alaska and from Alaska to the United States involved portions of the line between Eagle and Valdez. However, by 1907, it had become evident that maintenance costs for the land lines would continue to be exceedingly high and that wireless communications appeared feasible. In 1911, the Gulkana-Fort Egbert telegraph line, totaling some 290 miles, was abandoned in favor of wireless with an estimated savings of $50,000 annually. By 1915, there were only 848 miles of land line in operation within Alaska. A major portion of this comprised the line between Fort Liscum and Fairbanks along the 375-mile long Valdez to Fairbanks Trail (Richardson Highway). In 1923, the military recommended transferring the Valdez-Fairbanks line to the Alaska Road Commission for conversion to telephone service. The final transfer of the Valdez-Fairbanks telegraph line took place in 1926.

In the early 1900's, portions of the original telegraph route appear to have been used for trail access to the Fortymile gold fields.

Historical Trail Remnants

Most of the area traversed by the three study segments is largely isolated and appears much as when the original construction took place in 1900-1903.

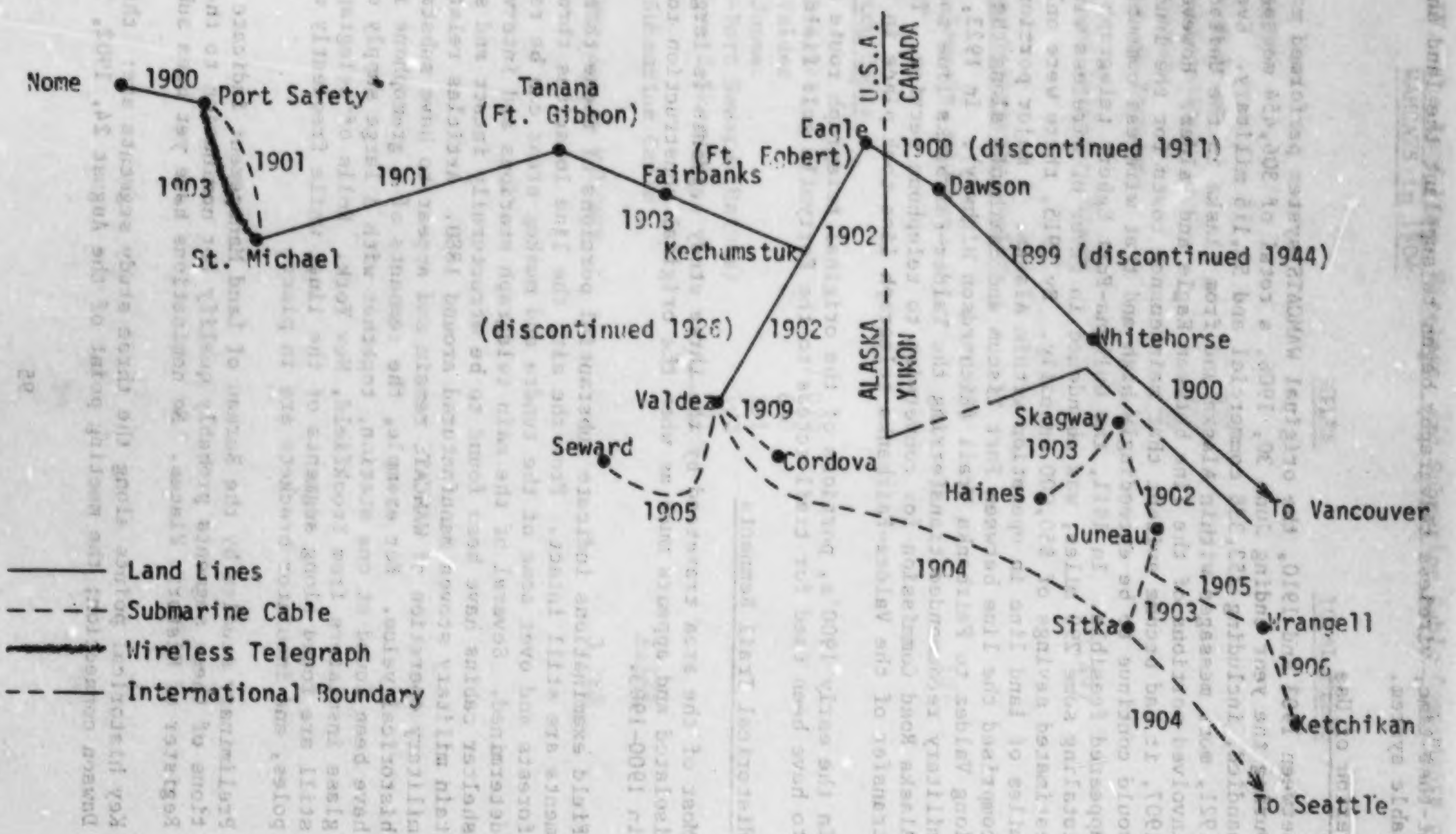
Field examinations indicate substantial portions of these three segments are still intact. From the air, the line locations through spruce forests and over some of the tundra and muskeg areas can be readily determined. Several of the main telegraph stations and intervening shelter cabins have been found to be structurally intact and still contain military stoves manufactured around 1880. Articles related to military operation of WAMCATS remain and appear to have substantial historical value. For example, the remnants of a gramophone instrument have been found at one station, together with a large supply of green glass insulators from Brookfield, New York. Rolls of telegraph wire still are found along segments of the line, while frequently wire, poles, and insulator brackets are in place.

Preliminary studies by the Bureau of Land Management indicate that portions of these segments probably qualify for nomination to the National Register of Historic Places. No nominations have yet been submitted.

Key historical points along the three study segments are: the Alaska-Dawson connection; the meeting point of the August 24, 1902, linkage

A sketch showing completion dates of the

Washington-Alaska Military Cable and Telegraph System



Nome
1900
Port Safety
1901
1903
St. Michael
1901
Tanana
(Ft. Gibbon)
Fairbanks
1903
Kechumstuk
(discontinued 1926)
Eagle
(Ft. Egbert)
1902
1902
U.S.A.
CANADA
ALASKA
YUKON
1900 (discontinued 1911)
Dawson
1899 (discontinued 1944)
Whitehorse
1900
Valdez
1909
Seward
1905
Cordova
Skagway
1903
Haines
1902
Juneau
To Vancouver
1904
1905
Sitka
1903
Wrangell
1906
Ketchikan
1904
To Seattle
Land Lines
Submarine Cable
Wireless Telegraph
International Boundary

of the Fort Egbert-Fort Liscum line near Tanacross; Kechumstuk, the main interconnection between telegraphic messages involving western Alaska forts, the rest of Alaska, and the outside; Fort Egbert, the major supply distribution point for construction of significant portions of the Fort Egbert-Fort Liscum-Fort Gibbon-Dawson lines; Summit Station, the primary supply depot and starting point for constructing the Goodpaster line; at least 13 primary telegraph relay stations; an unknown number of emergency shelters; and substantial tangible evidence of the original line locations as well as alternative routings and key segments where wire insulators and poles remain intact.

Related Historic Sites

The Eagle National Historic District, including the entire Fort Egbert site was placed on the National Register of Historic Places in 1972. The Eagle area is also a key element of the proposed Yukon-Charley National Rivers extending from the vicinity of the United States border to Circle.

There are substantial and significant international values associated with the Canadian gold fields at Dawson and Canadian historic and park programs associated with Dawson and the Fort Cudahay-Fortymile sites.

The Fortymile River, encompassing portions of the original WAMCATS line, several relay stations, and military shelter cabins, has been recommended for inclusion in the National Wild and Scenic Rivers System. If approved by Congress, this river and adjoining lands would be managed by the Bureau of Land Management. Conceptual management and development plans prepared for that proposal also involve plans to protect and interpret WAMCATS and the role of gold mining in the settlement of Alaska.

The abandoned Native communities of Joseph and Kechumstuk are believed to have substantial Native historic and cultural values. It is presumed that both sites will be placed in Native ownership under the provisions of the Alaska Native Claims Settlement Act.

The Eagle Historic Society, Chicken Historic Society, Alaska Division of Parks, National Park Service, Bureau of Land Management, Canadian Park Service, and several Alaskan Native communities all have a strong interest in the historic and cultural values of this area.

Historical Significance

One of the most important and lasting events associated with the discovery of gold in Alaska and the ensuing gold rushes was the development of a communications system which tied together far-flung gold fields and military posts within Alaska and linked them with the remainder of the United States. The Washington-Alaska Military Cable and Telegraph System, authorized by the Congress on May 26, 1900,

Fort Egbert restoration. (Bureau of Outdoor Recreation) commemorates an unparalleled effort in the annals of telegraphic engineering due to the large scope of the effort and the challenge of constructing and operating reliable, quick communication in an unknown and largely uninhabited region.

PRESENT AND PROSPECTIVE TRAIL USES

Present Trail Condition

Most of the WAMCATS overland route involved in the three study segments is in a run down condition having been substantially without maintenance since abandonment around 1911. Small portions, notably in the Mentasta Pass area, Kechumstuk, and lower Goodpaster River, have been converted to primitive trails for vehicular access and/or winter haul roads. Current editions of U. S. Geological Survey maps indicate a network of trails in the upper Fortymile drainage. On-the-ground inspection revealed that these trails follow the original telegraph line.

Through forested areas, the slow regeneration of trees where the line was constructed makes much of the route readily visible from the air. In alpine and muskeg areas, location is more difficult.

Scenic and Recreational Qualities

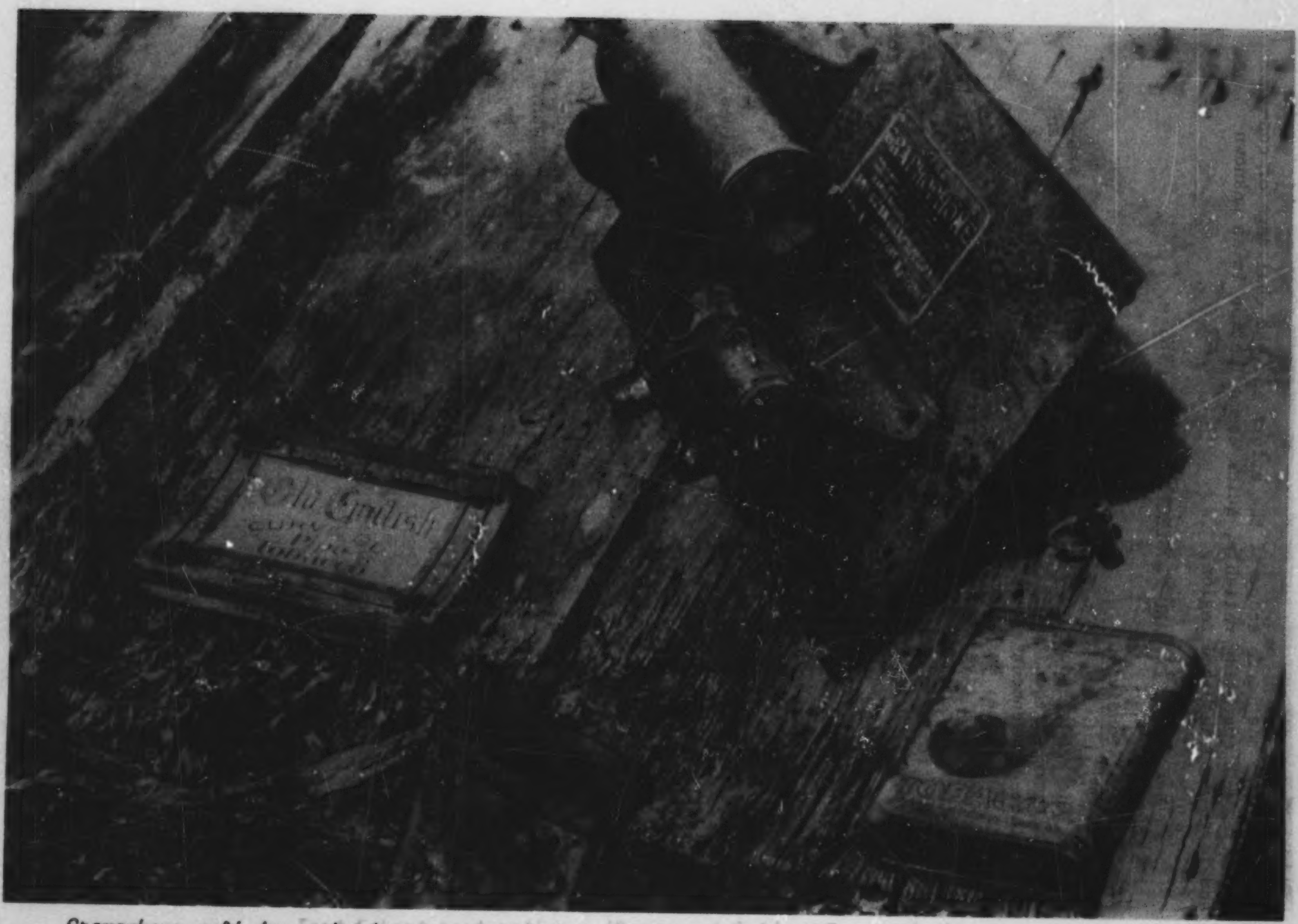
The three segments have a diverse and pleasing array of scenic values ranging from the Yukon and Tanana Rivers to sweeping vistas of the Alaska Range in the tundra divide of the Fortymile drainages.

Ground checks of the original route in selected parts of the Fortymile drainage indicated those portions have substantial recreation potential as hiking trails and perhaps horseback trails. Since the WAMCATS line was designed to be serviced on foot, mule, snowshoe, or dogsled, adverse terrain features were avoided whenever possible. However, many crossings of steep ravines, rivers, and muskeg could not be avoided.

As most portions of the WAMCATS route are well removed from the existing highways, the route provides access into areas which are still primitive and undeveloped. Opportunities to view wildlife--ranging from Dall sheep in the higher elevations near Mentasta and Eagle to moose, wolves, caribou, and numerous smaller animals and birds--are excellent. There are many interesting geological and floral features.

Recreational Uses

Except for visitors to the Eagle area, present recreational use of the three segments is almost nonexistent. Some of the route is used for hunter and fisherman access, principally in the Kechumstuk area. While there are no records, this use probably does not exceed 20 recreation days annually. Poor access and lack of public knowledge of the area are the principal reasons for the light use.


Old English

Gramaphone cylinder and tobacco cans found in the Forty Mile River area. (Bureau of Outdoor Recreation)

Future potential recreational use could include hiking, horseback riding, cross-country skiing, dog mushing, and snowshoeing. Portions of the route could also be used by riders of snowmachines in winter and trail bikes in summer.

Nonrecreational Uses

Portions of the line are being utilized for vehicular access to mining claims and trapping headquarters. At present, these uses involve only a minor amount of the 376 miles included in this analysis.

Several of the main relay stations, and possibly emergency shelters, constructed by the military are included within pending applications under the 1906 Native Allotment Act. Therefore, it is likely that some of the historic structures associated with WAMCATS will pass into private ownership.

In July 1973, the Alaska Department of Highways submitted to the Joint Federal-State Land Use Planning Commission long-range plans to construct a highway affecting the route. These plans include a substantial portion of the original, largely unaltered portion of WAMCATS in the Goodpaster drainage and the Fortymile River basin. However, the Department of Highways, by letter of December 3, 1974, to the Bureau of Outdoor Recreation, stated that present planning indicates if a highway is ever built in the corridor, the Salcha rather than the Goodpaster drainage system would be followed. A highway in the Salcha River drainage would have minimal effects on WAMCATS.

CONCLUSIONS AND RECOMMENDATIONS

Qualification for National Scenic Trail Designation

The criteria used in evaluating the WAMCATS Trail are as follows:

Criterion: Because of their special characteristics, National Scenic Trails should be nationally significant and be capable of attracting visitors from throughout the United States.

Finding: The three segments of WAMCATS totaling 376 miles are of national historic significance in their relationship to the settlement and exploration of Alaska during the stampedes of gold seekers to and from the Alaskan and Canadian gold fields and capable of attracting visitors from throughout the United States. A wide variety of high quality outdoor recreation opportunities for hiking, horseback riding, cross-country skiing, snowshoeing, dogsledding, nature study, and geological study in a largely natural, scenic portion of Alaska are found along these three segments.

Criterion: National Scenic Trails are designated for hiking and other compatible uses. The National Trails System Act prohibits the use of motorized equipment on these trails, except in certain circumstances.

Finding: The historic route is largely undeveloped at present, although much of the trail, lines, and cabins remain intact, making it feasible to develop a trail along the general route for hiking and other compatible purposes.

Criterion: National Scenic Trails of historical importance should adhere as accurately as possible to their principal historic routes.

Finding: The routes from Fort Egbert to the United States/Canada border comprising 11 miles, Fort Egbert to Slana comprising 220 miles, and Kechumstuk to Quartz Lake comprising 145 miles follow the original location of key sections of WAMCATS.

Criterion: National Scenic Trails should be provided with adequate public access through connecting local or regional trails. Access should be located at reasonable intervals to provide for trips of various lengths.

Finding: Access to the Eagle-Fort Egbert area is by auto over the Taylor Highway and by air. A small airstrip at Joseph provides access to the central portion of the Kechumstuk-Quartz Lake segment while the Richardson Highway provides auto access to the Quartz Lake area. The Alaska Highway intersects WAMCATS at Tanacross, while the Glenn Highway provides good access in the Mentasta-Slana area. The Alaska, Richardson, and Glenn Highways are paved roads open to year-around travel. The Taylor Highway is unpaved and not maintained during the winter months.

Criterion: National Scenic Trails should be primarily land based.

Finding: The 376-mile segment of WAMCATS is, except for river crossings, land based in its entirety. A major river, the Tanana, is crossed. Several tributaries to the Fortymile are also crossed.

Criterion: National Scenic Trails should be of sufficient length to encompass and provide appropriate access to the resources which are a basis for the trail's designation.

Finding: The three study links total approximately 376 miles.

Criterion: National Scenic Trails should be continuous except where no practicable or feasible interconnection exists.

Finding: The 376 miles are interconnected and could be considered as continuous.

Conclusions

The history of WAMCATS is fascinating and many people could receive a valuable and enjoyable experience by viewing some of the remaining traces and having these interpreted. A number of the main telegraph stations, intervening shelter cabins, and telegraph poles are intact. The remnants, however, are somewhat repetitive.

WAMCATS should not be designated as a National Historic Trail. That category should be open only to routes which made history as trails. WAMCATS served primarily as a telegraph line and not as a trail.

Recommendations

The historical importance of WAMCATS is undisputed. The question is how to protect and provide for its interpretation. Protection of the remaining remnants should be a prime consideration in future land use planning by the Bureau of Land Management. Many structures of the era exist in Eagle and some are being rehabilitated. The Bureau plans to interpret these structures and tell the story of WAMCATS. They also plan to display relics from the telegraph line. In conjunction with this, the Bureau should consider developing spur trails from the Taylor Highway to locations on the line and perhaps for short distances along the line. Interpretive signing should be done at these locations. It would be desirable if some of these trails pass a shelter cabin and should be located where some poles are still standing and the old line route is easily identified. No further consideration should be given to WAMCATS as a potential National Scenic Trail or as a National Historic Trail.

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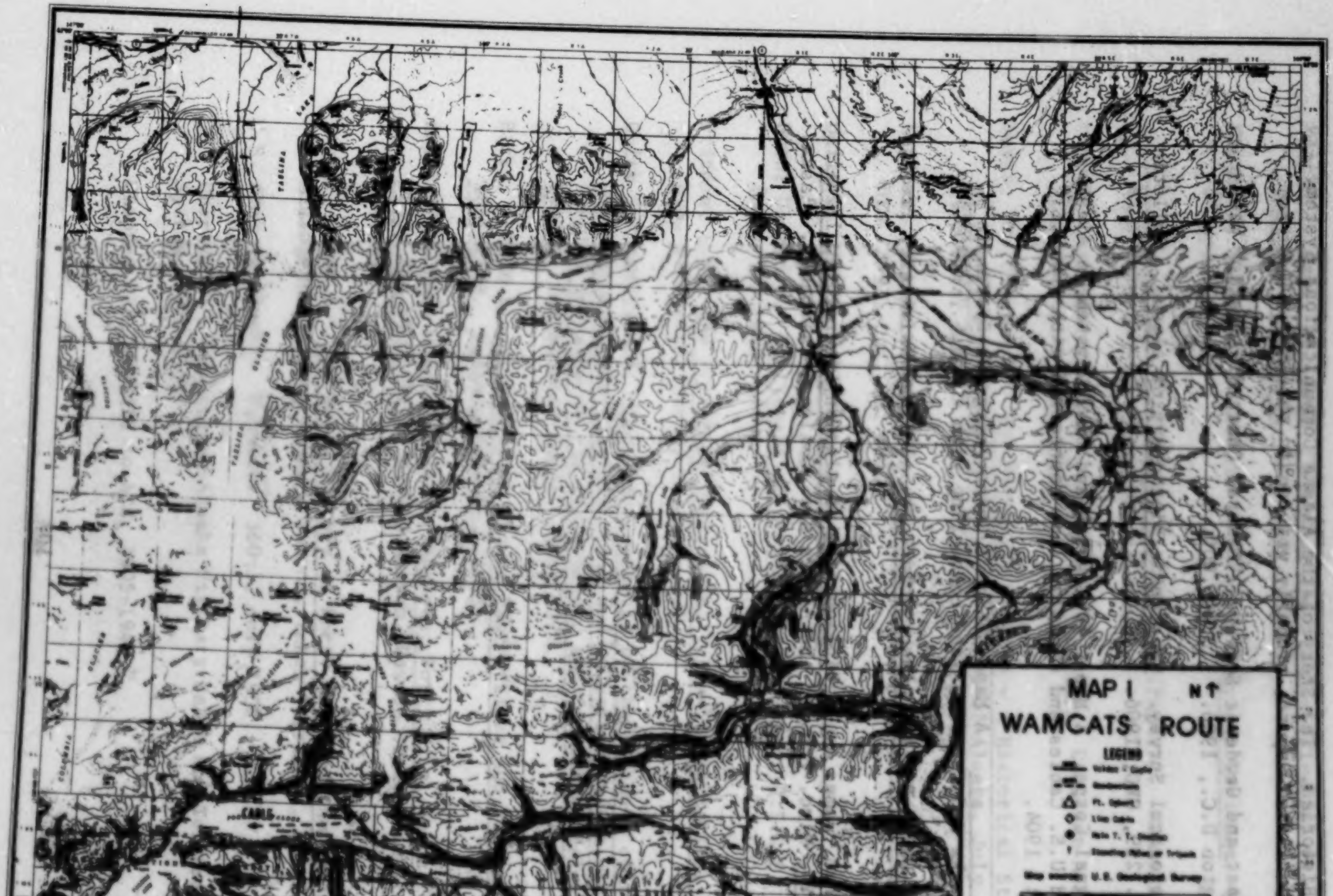
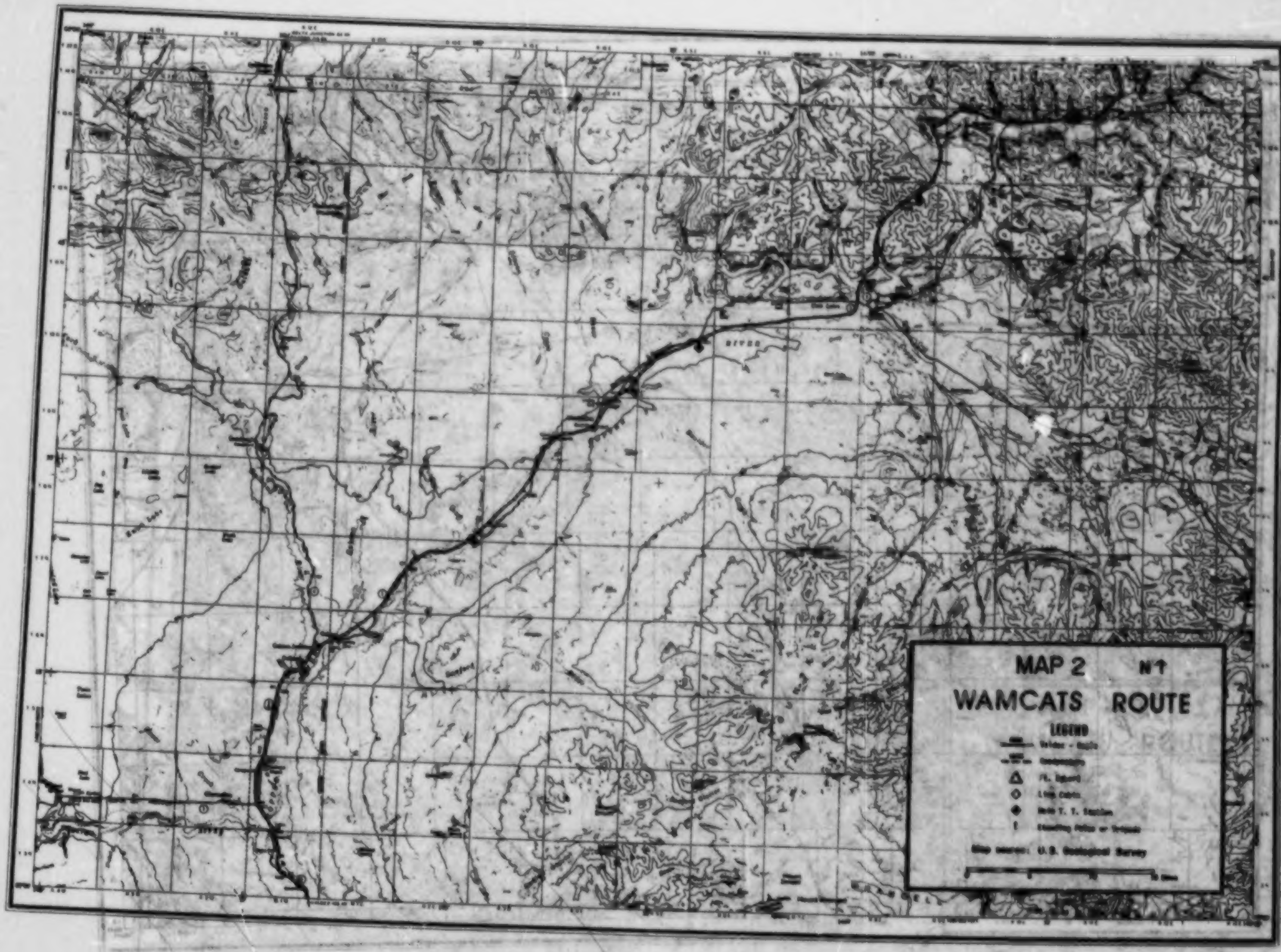
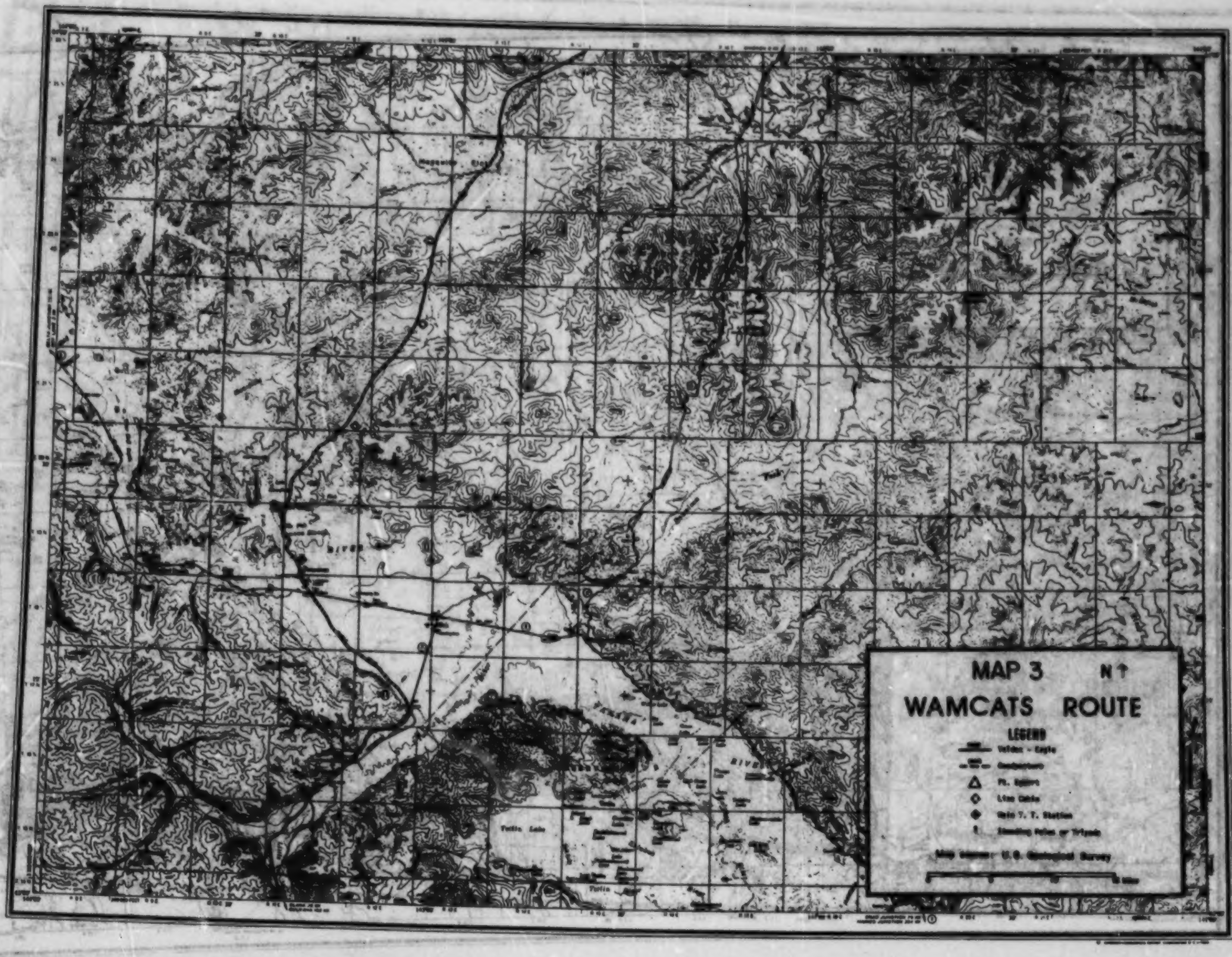
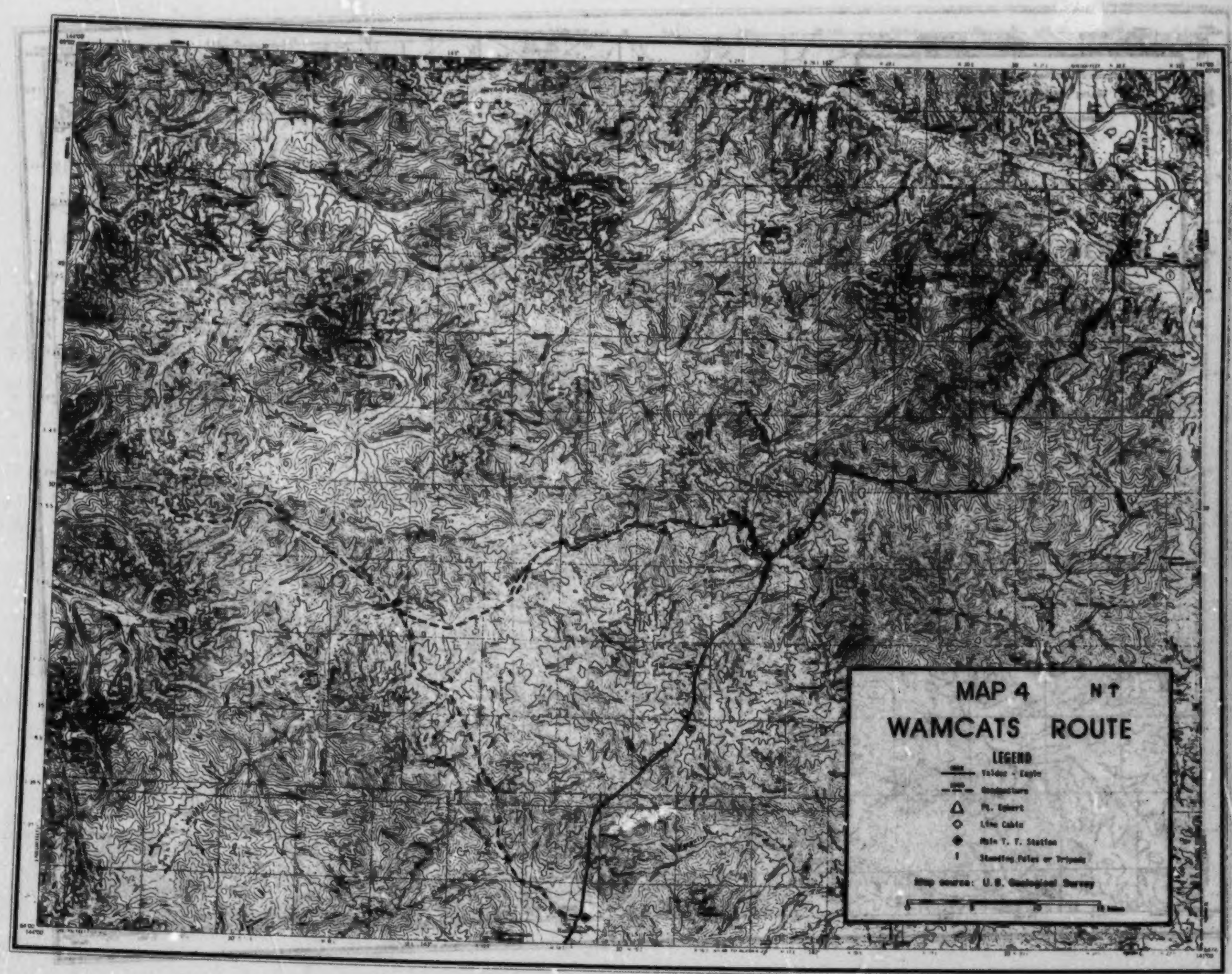

MAP I N↑

WAMCATS ROUTE

LEGEND
Ft. Egbert
Line Cabin
Standing Poles or Tripods
Map source: U.S. Geological Survey
TASLINA
CAGLE


MAP 2
N↑
WAMCATS ROUTE
LEGEND
Map source: U.S. Geological Survey

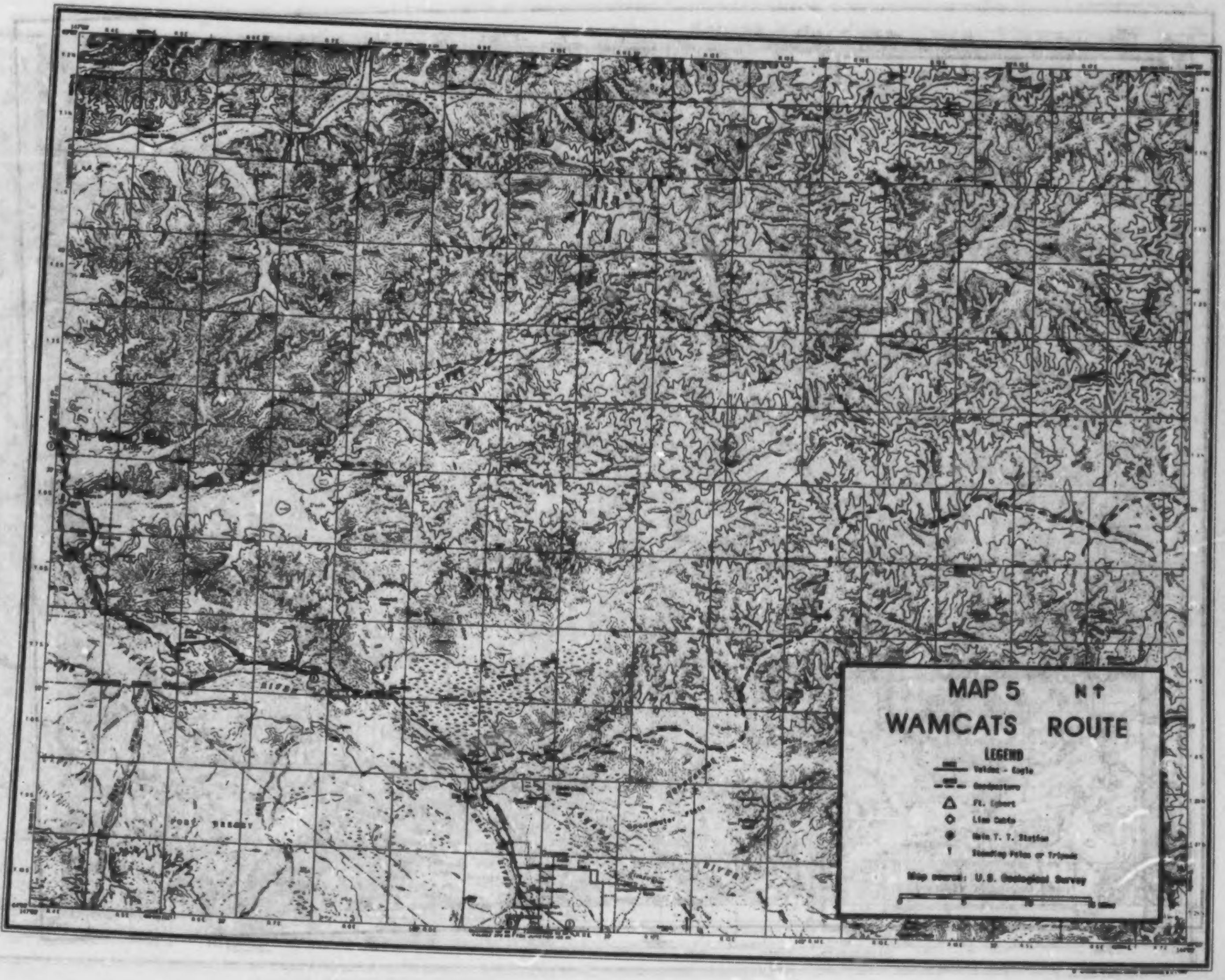

MAP 3
N ↑
WAMCATS ROUTE
LEGEND
Valdez - Eagle
Line Cable
Main T. T. Station
Standing Poles or Tripods
Map source: U.S. Geological Survey
Tulin Lake



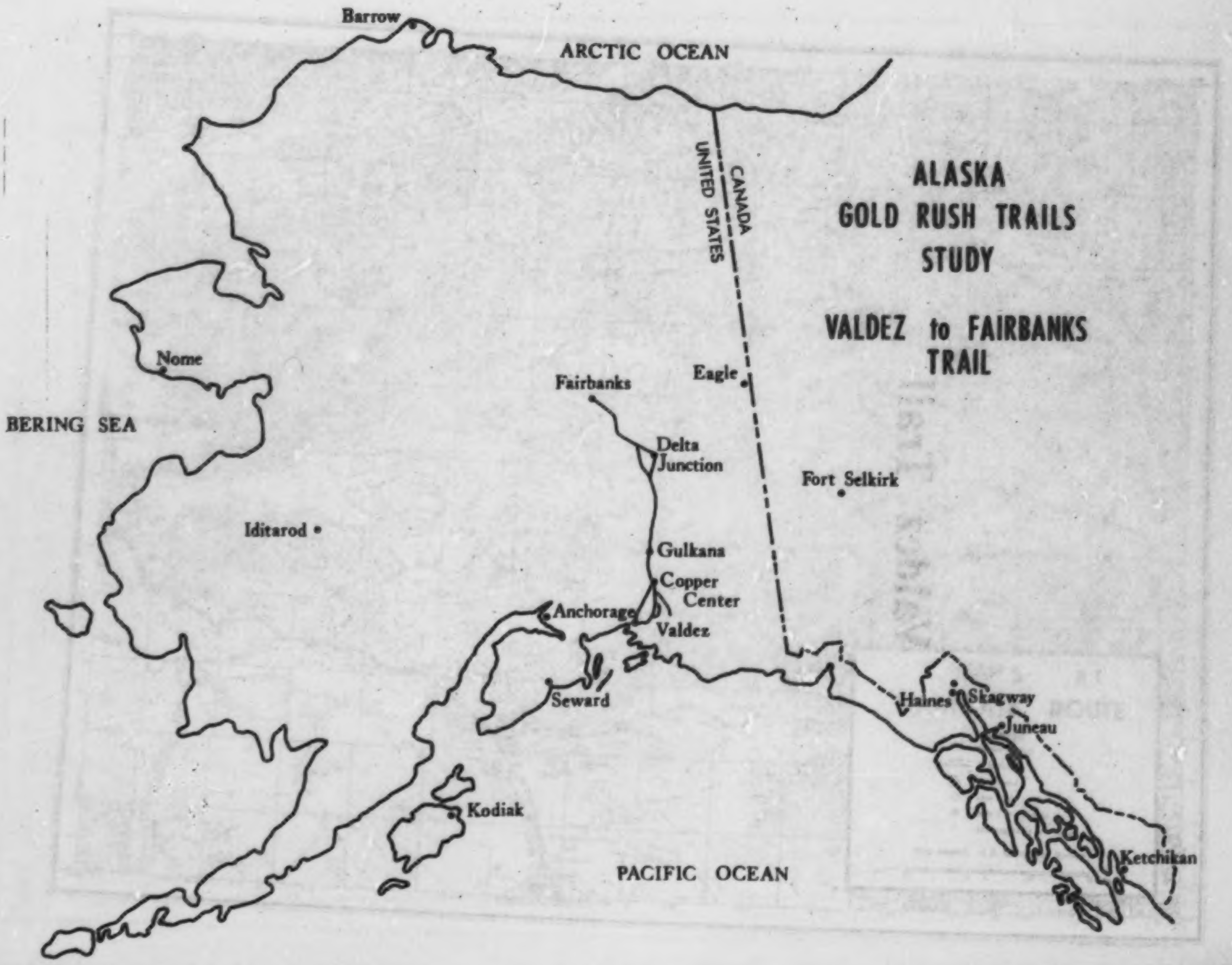
MAP 4

WAMCATS ROUTE

N ↑
LEGEND
Valdez - Eagle
Goodpaster
Rpt. Report
Line Cabin
Main T. T. Station
Standing Poles or Tripods
Map source: U.S. Geological Survey
0
5
10
15 Miles


MAP 5
N ↑
WAMCATS ROUTE
LEGEND
Valdez - Eagle
Goodpaster
△ Ft. Egbert
○ Lime Cache
● Main T. T. Station
Standing Poles or Tripods
Map source: U.S. Geological Survey
0 5 10 15 Miles

Valdez Trail



ALASKA
GOLD RUSH TRAILS
STUDY

VALDEZ to FAIRBANKS
TRAIL

Barrow
ARCTIC OCEAN
CANADA
UNITED STATES
Nome
BERING SEA
Fairbanks
Eagle
Delta Junction
Fort Selkirk
Iditarod
Gulkana
Copper Center
Anchorage
Valdez
Seward
Haines
Skagway
Juneau
Kodiak
Ketchikan
PACIFIC OCEAN

VALDEZ TRAIL (VALDEZ TO FAIRBANKS)

BACKGROUND

Alaska was purchased by the U. S. Government from Russia in 1867. For at least two decades following, the purchasers knew little about most of interior Alaska since the Russians had concentrated along the islands and coastal areas, particularly in Alaska's panhandle. Early explorations into the interior were conducted along the Yukon River. The first official exploration in the area of what was to become the Valdez Trail occurred in the summer of 1884. Lieutenant William R. Abercrombie, U. S. Army, was instructed to lead a party making a reconnaissance of the Copper River. Lieutenant Abercrombie explored the Copper River, reaching a position of latitude 60°41' on the river, then returned to Nuchek on Hinchinbrook Island. The party also made explorations in the direction of what is now Valdez.

The U. S. Army, in 1885, sent Second Lieutenant Henry T. Allen to further explore the interior. He proceeded to travel up the Copper River and down the Tanana River valley exploring the Chitina River and other tributaries. Lieutenant Allen met some early prospectors along the Copper River, most notably John Bremner, after whom the Bremner River is named.

Alaska, in the 19th Century, remained an undeveloped country. Other than U. S. military activity, gold seekers seemed to be almost the only persons from the outside interested in Alaska. Because of the prospectors in the Yukon, Tanana, and Copper River areas, the U. S. Army, in 1898, ordered further explorations in order to provide better access, communication, and other aid to these people. Captains Abercrombie and Glenn were ordered to further explore up the Copper River from Valdez. One of the objectives was to find an all-American route (trail) from Valdez to the Yukon. Valdez had come into being November 10, 1897, when ship passengers landed near what was to become Fort Liscum. Construction of Fort Liscum was started in the spring of 1900, almost 3 years later.

Transportation to the gold fields in Alaska and to the Klondike in Canada was mainly by river and was to remain so. However, additional non-water routes were necessary, particularly to an ice-free winter port. Although the Valdez to the Yukon (Fort Egbert, later Eagle) route was explored earlier, it was not until 1900 that an actual trail was started. The trail was independent of the military communications lines (WAMCATS), although both were being built during the same period, between the same settlements, and in some places were close together. The all-American route was originally to go from Valdez to Fort Egbert on the Yukon. Because of gold strikes around Fairbanks and the growing importance of that area, the main line was diverted at Gulkana (mile 128) and rerouted to Fairbanks. Although the trail was started by the military and was originally planned to be used as a military road, interest and use by nonmilitary made it a general use route, almost from the beginning. The Valdez to Fairbanks trail eventually developed into the present-day Richardson Highway, named after General Wilds P. Richardson, the man credited with guiding the construction of the route.

LOCATION AND REGIONAL ENVIRONMENT

General Alignment

The accompanying maps outline the known trails from Valdez to Fairbanks. The main route and two shorter side routes formed the major trail from Valdez to Fairbanks. All were used during the Gold Rush Era.

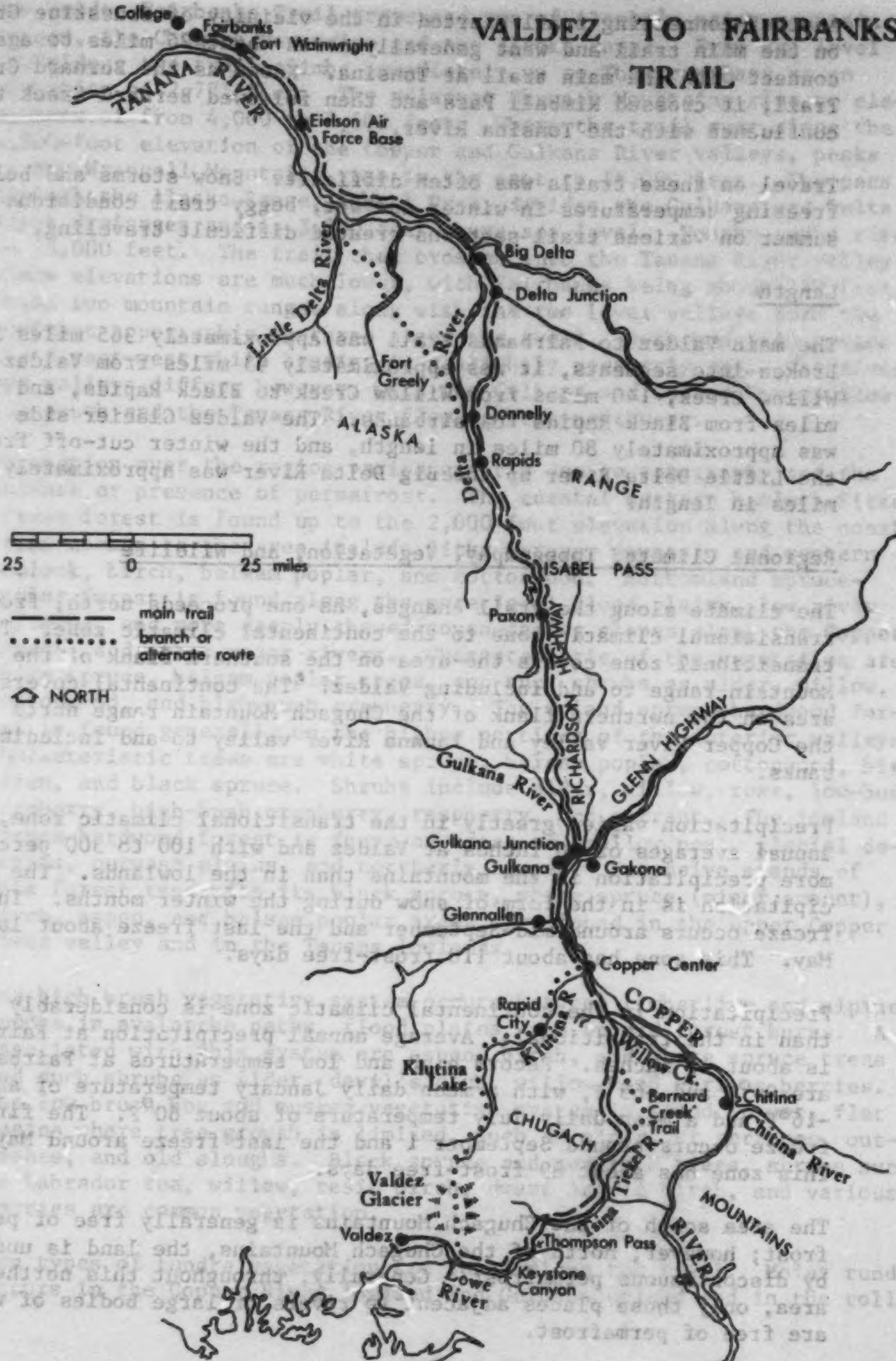
The main Valdez to Fairbanks Trail left Valdez, crossed the Valdez Glacier delta, up through Keystone Canyon, and up the Lowe River valley to Thompson Pass, in the Chugach Mountains. From here, the trail passed through the Tsina River and Tiekel River gorges, and then followed the Tiekel valley crossing the Tonsina River to Willow Creek. Continuing northward, it crossed the Klutina River and paralleled the Copper River. The trail crossed the Tazlina River and followed the west bank of the Copper River to the Gulkana River. It crossed the Gulkana at its mouth, then paralleled this river to its headwaters. The trail went over Isabel Pass, through the Alaska Range, and then along the Big Delta River to its confluence with the Tanana River. The trail crossed to the north bank of the Tanana River and followed the river to Fairbanks.

One of the shorter side routes from the main trail was a winter alternative route along the northern end of the main trail. It was used because it saved 13 miles, was fairly level, and was protected from winter storms. This side route cut off at Little Delta River and headed south to a point approximately 35 miles up the Delta River.

The other major side route was the one first used by the early prospectors in 1896-98 who went to Valdez by ship, planning then to go north via the Copper River to the gold fields. This side route left Valdez, went north across Valdez Glacier and the Chugach Mountains, down Klutina Glacier to Klutina Lake, then by boat down the Klutina River to what was to become Copper Center at the confluence of the Klutina River with the Copper River. At this point, this side route, known as the Valdez Glacier Trail and later called the Death Trail of '98, rejoined the main Valdez to Fairbanks Trail.

An important connecting trail led to the copper fields in the Chitina and Copper River valleys. This connecting trail started at Willow Creek on the Valdez to Fairbanks trail and went southeast approximately 39 miles to the present-day town of Chitina.

VALDEZ TO FAIRBANKS TRAIL


College
Fairbanks
Fort Wainwright
TANANA RIVER
Eielson Air Force Base
Little Delta River
Big Delta
Delta Junction
Fort Greely
Delta River
Donnelly
ALASKA
Rapids
RANGE
25
0
25 miles
ISABEL PASS
Paxon
main trail
branch or alternate route
NORTH
RICHARDSON HIGHWAY
GLENN HIGHWAY
Gulkana River
Gulkana Junction
Gulkana
Gakona
Glennallen
Copper Center
Rapid City
Klutina R.
COPPER
Willow Cr.
Klutina Lake
Bernard Creek Trail
Chitina
CHUGACH
Chitina River
Tiekel R.
Tsina
MOUNTAINS
RIVER
Valdez Glacier
Valdez
Thompson Pass
Keystone Canyon
Lowe River

Another connecting trail started in the vicinity of Ernestine Creek on the main trail and went generally north about 25 miles to again connect with the main trail at Tonsina. Known as the Bernard Creek Trail, it crossed Kimball Pass and then followed Bernard Creek to its confluence with the Tonsina River.

Travel on these trails was often difficult. Snow storms and below freezing temperatures in winter and wet, boggy trail conditions in summer on various trail sections created difficult traveling.

Length

The main Valdez to Fairbanks Trail was approximately 365 miles long. Broken into segments, it was approximately 93 miles from Valdez to Willow Creek, 140 miles from Willow Creek to Black Rapids, and 132 miles from Black Rapids to Fairbanks. The Valdez Glacier side trail was approximately 80 miles in length, and the winter cut-off from the Little Delta River up the Big Delta River was approximately 55 miles in length.

Regional Climate, Topography, Vegetation, and Wildlife

The climate along the trail changes, as one proceeds north, from the transitional climatic zone to the continental climatic zone. The transitional zone covers the area on the southern flank of the Chugach Mountain range to and including Valdez. The continental covers the area on the northern flank of the Chugach Mountain range north through the Copper River valley and Tanana River valley to and including Fairbanks.

Precipitation varies greatly in the transitional climatic zone, with annual averages of 60 inches at Valdez and with 100 to 300 percent more precipitation in the mountains than in the lowlands. The precipitation is in the form of snow during the winter months. The first freeze occurs around mid-September and the last freeze about late May. This zone has about 110 frost-free days.

Precipitation in the continental climatic zone is considerably less than in the transitional. Average annual precipitation at Fairbanks is about 11 inches. Record high and low temperatures at Fairbanks are 99°F and -65°F, with a mean daily January temperature of about -16°F and a mean daily July temperature of about 60°F. The first freeze occurs around September 1 and the last freeze around May 20. This zone has about 89 frost-free days.

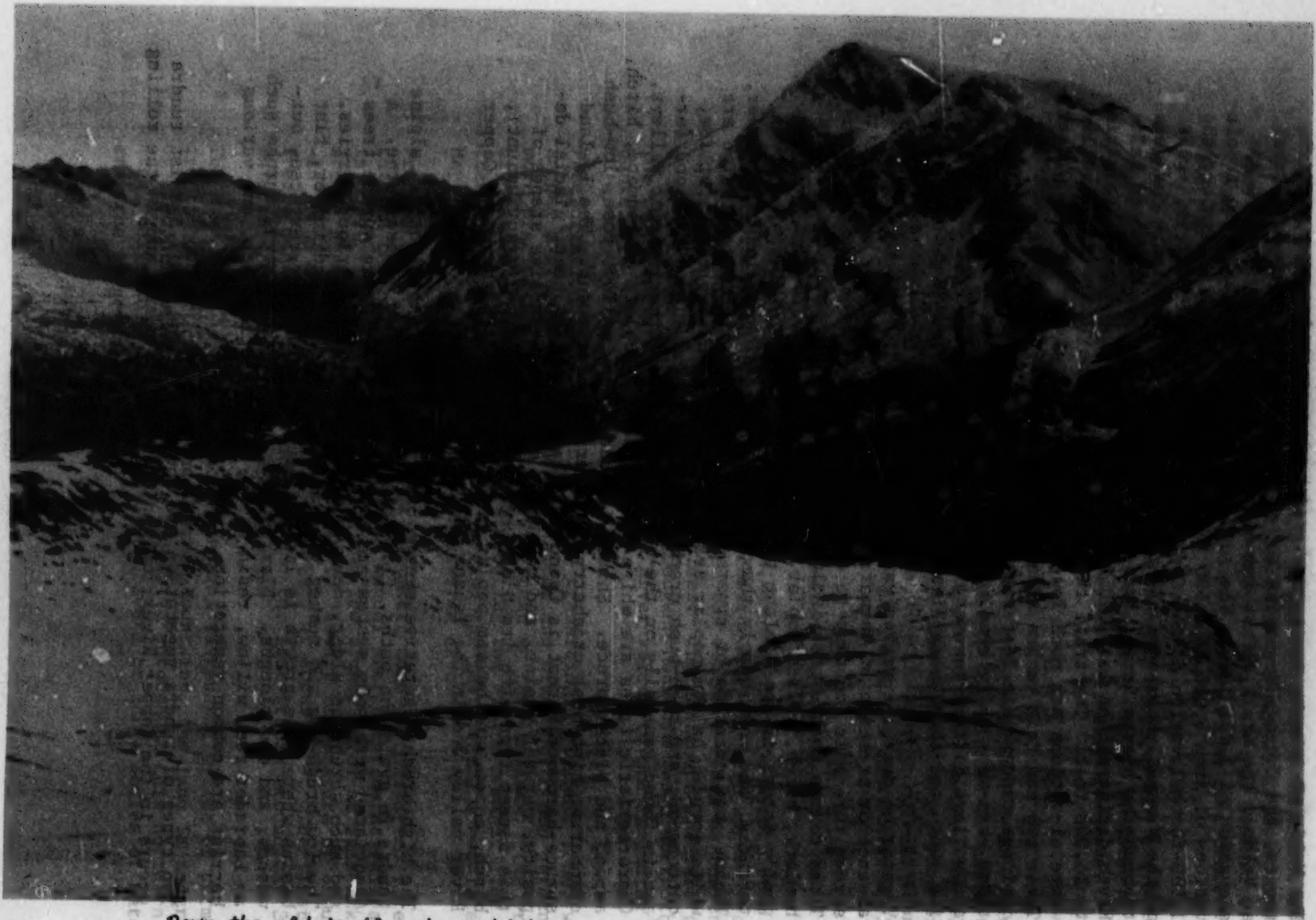
The area south of the Chugach Mountains is generally free of permafrost; however, north of the Chugach Mountains, the land is underlain by discontinuous permafrost. Generally, throughout this northern area, only those places adjacent to rivers or large bodies of water are free of permafrost.

The Valdez-Fairbanks Trail traversed two of Alaska's major mountain ranges, the Chugach Mountains and the Alaska Range. From sea level at Valdez, the trail climbs immediately up to Thompson Pass at an elevation of 2,771 feet. The adjacent Chugach Mountains rise to elevations of from 4,000 to 8,500 feet. Where the trail runs along the 1,500-foot elevation of the Copper and Gulkana River valleys, peaks of the Wrangell Mountains rise in the east to 16,000 feet. The pass through the Alaska Range, Isabel Pass, divides the Gulkana and Delta River drainages and is 3,000 feet above sea level. Nearby peaks rise to 13,000 feet. The trail then crosses into the Tanana River valley where elevations are much lower, with Fairbanks being about 350 feet. These two mountain ranges along with the two lower valleys form the dominant topographic features along the trail. Both mountain ranges trend east-west while bending in a slightly northerly arc. The rivers and valleys differ, however, with the Gulkana and Copper Rivers flowing south and the Tanana River flowing west-northwest.

Vegetation over the region varies greatly due to topography and the absence or presence of permafrost. The coastal western hemlock-Sitka spruce forest is found up to the 2,000-foot elevation along the coast. Trees common to the area include Sitka spruce, mountain and western hemlock, birch, balsam poplar, and cottonwood. Bottomland spruce-poplar forest is found along the more level flood plains, low river terraces, and more deeply thawed south-facing slopes along the Copper, Tanana, and other major rivers. Characteristic of the vegetation are white spruce, balsam poplar trees, and such shrubs as alder, willow, cottonwood, and high-bush cranberry. The upland spruce-hardwood forest is found generally on the higher portions of the interior valleys. Characteristic trees are white spruce, balsam poplar, cottonwood, birch, aspen, and black spruce. Shrubs include alder, willow, rose, low-bush cranberry, high-bush cranberry, raspberry, and currant. The lowland spruce-hardwood forest is found on areas of shallow peat, glacial deposits, outwash plains, and northerly slopes. Extensive stands of this forest type with its black spruce, white spruce (minor amount), birch, aspen, and balsam poplar trees, are found in the upper Copper River valley and in the Tanana lowlands.

The high brush vegetative system occurs between timberline and alpine tundra in avalanche paths, flood plains, and on old forest burns. A Associated with this system are aspen, birch, and white spruce trees and such shrubs as alder, devil's club, willow, and various berries. The low brush bog and muskeg vegetative system is found in wet, flat basins where tree growth is limited, such as old river terraces, outwashes, and old sloughs. Black spruce and tamarack trees, shrubs such as Labrador tea, willow, resin birch, dwarf Arctic birch, and various berries are common vegetation.

Two types of tundra vegetation are found along the trail. Moist tundra occurs in the Copper River lowland and Gulkana upland and in the rolling



Down the old trail and new highway route from Thompson Pass, north of Valdez.
(Bureau of Outdoor Recreation)

foothills on the northern side of the Alaska Range at 2,000- to 4,000-foot elevations. Various shrubs, grasses, and herbs make up this vegetative system.

Alpine tundra is typically found on mountains, including barren rock and rubble areas, alluvial fans, and drier river terraces. It occurs in the Alaska Range and Chugach Mountains. Vegetation in the system includes shrubs such as resin birch, Labrador tea, mountain heather, rhododendron, and berries; also herbs such as avens and moss-campion; and grasses, mosses, lichens, and sedges.

Large game animals are common throughout the trail area. Grizzly bear, black bear, wolves, wolverine, barren ground caribou, bison, moose, and Dall sheep are present in varying populations. Small mammals found are lynx, fox, otter, mink, marten, beaver, muskrat, and snowshoe hare. Important waterfowl nesting areas are located along the Tanana River and Copper River deltas. Raptors found are bald eagles, peregrine falcons, ospreys, goshawks, and several owl and other hawk species.

Land Uses and Access

Permanent settlements along the trail include Valdez, Copper Center, Glennallen, Gulkana, Gakona, Donnelly, Delta Junction, North Pole, Fairbanks, and College. Fairbanks, with the largest population and most development, is the service center for interior Alaska. Most of the lands along the trail are relatively uninhabited. Three military bases are located along the trail--Fort Wainwright (Army) and Eielson (Air Force) near Fairbanks, and Fort Greely (Army) near Delta Junction.

Overlying or closely paralleling the trail is the Richardson Highway, a major paved road. It starts at Valdez and goes north to join the Alcan Highway, another major road, at Delta Junction. The trail originally was to be the main route from southcentral (coastal) Alaska into the interior for communication and other services. It developed from a trail, to a sled/wagon route, to a major highway over a period of 25 years. The Richardson Highway remains today a major north-south route through Alaska. Through the past half century, the highway has typically undergone some realignment, but still follows most of the original Valdez-Fairbanks Trail. The trail length from Valdez to Thompson Pass is the only major portion where the original main trail parallels the highway rather than being overlain or crisscrossed by the highway. The Bernard Creek Trail (connecting trail) is almost as long as the Valdez to Thompson Pass section and is not overlain by a highway.

The Alcan Highway, built during World War II, serves as the only land access to Alaska from the contiguous United States. It is paved in Alaska and graveled through Canada. From Delta Junction to Fairbanks, the Alcan Highway follows the trail. Both the Richardson and Alcan Highways are heavily used for commercial transport, access between Alaskan towns, and driving for pleasure.

Another major land use is the trans-Alaska oil pipeline which passes through a corridor generally following the trail route. The pipeline corridor goes from the north slope of Alaska through Fairbanks to the south side of Valdez Arm across from the town of Valdez. This corridor varies in width but lies in the general trail area along the entire Valdez-Fairbanks Trail.

The areas considered better for settlements and intensive development along the north half of the trail exist near the highway system on leve terraces with suitable soils. Along the south half of the trail, only limited areas are considered suitable for intensive development, mostly in the Copper River valley and along some of its tributaries.

General Land Ownership

Much of the land surrounding Fairbanks and down through the Tanana valley and continuing up to the approximate summit of the Alaska Range is State patented or State selection lands. The exceptions are the limited private lands mainly at Fairbanks, military withdrawn areas, and Native withdrawals in the upper Tanana valley which are mostly outside the trail area, and the utility and transportation corridor south from approximately Delta Junction.

The area from the Alaska Range summit south to the vicinity of Gulkana is mostly Native withdrawal and utility and transportation corridor withdrawal lands. State selection lands and Native withdrawal lands comprise most of the area from Gulkana to just south of Copper Center. Native withdrawal lands, State selection lands (around Valdez), and utility and transportation corridor lands lie between Copper Center and Valdez.

Native land selections continue, and all State land selections are to be made by 1985.

The Valdez to Fairbanks Trail was part of the territorial system of roads and trails, constructed and/or maintained by the Alaska Road Commission using Federal and/or territorial monies. The State of Alaska maintains that a right-of-way still exists in the name of the State along all such roads and trails pursuant to revised Statute 2477 passed by Congress in 1866.

Period and Type of Use

Early explorations by the military were made in the Prince William Sound area and up into the Copper River valley and elsewhere in Alaska in the 1800's. The expressed purpose of these ventures was to gather any and all types of information about the land and people, particularly in the interior areas, since very little information existed.

The discovery of gold in the 1890's, first in the Klondike region of Canada and then in the Fairbanks-Circle-Eagle-Tanana Valley areas and the Copper River area, caused worldwide interest in Alaska and northwestern Canada. The first gold-seekers made their way across the Coastal Mountains via the Dalton Trail, White Pass Trail, and Chilkoot Trail in southeastern Alaska to the Klondike gold fields or traveled by boat up the Yukon River. As further gold discoveries were made elsewhere in Alaska and as increasing numbers of people headed north from Seattle--their minds filled with stories of great riches, giant nuggets, and tons of gold--new routes were sought.

Due to the early military explorations in the area of Prince William Sound, prospectors began leaving Seattle via boats to the Valdez area with the plan of crossing the Chugach Mountain Range to the interior gold fields. False information from unknown sources, probably inspired and expanded upon by gold fevered men in Seattle and based on wild guesses and little fact, was spread about a trail over Valdez Glacier to the interior. The town of Valdez came into being when these prospectors first landed near the future Fort Liscum site in November 1897 and founded Valdez. An estimated 3,500 people landed at Valdez and attempted to cross the Valdez Glacier during the winter of 1897-98. Of this number, only about 260 successfully crossed the glacier and made it to the gold fields. So many died on the trail during that winter that it became known as the Death Trail of '98.

The Valdez Glacier Trail ran from Valdez northeast up and across Valdez Glacier, down Klutina Glacier to Klutina Lake, down the lake, then down the Klutina River through 25 miles of rapids to its confluence with the Copper River. The town of Copper Center was established at the confluence. Valdez Glacier was not the only dangerous trail section; a 25-mile long rapids on the Klutina also took its toll of adventurers. Many prospectors built boats at Klutina Lake and attempted to float to Copper Center. The rapids are reported to have claimed nine of every ten boats. On June 1, 1898, 36 wrecked boats were counted. Many prospectors, upon hearing about these rapids, either lined their boats down or gave up on going to the gold fields. However, in 1898, a trail was established along the Klutina River section which provided an alternative to running the rapids.

After traversing a difficult and dangerous trail and spending a summer and fall working hard in the search for gold, another hardship befell the prospectors in the Copper River valley--scurvy. During the winter of 1898-99, many died of this disease.

Captain Abercrombie, an earlier explorer of Valdez and the Copper River valley, returned to Valdez in the spring of 1899. He had previously searched for an all-American route into the interior from Valdez. His orders, General Order 51 dated March 20, 1899, directed an expedition to proceed to Valdez and from there open a military road to Copper Center. When Captain Abercrombie arrived at Valdez on April 21, 1899, he found over 80 destitute prospectors under the care of Quartermaster Charles Brown, many ill with scurvy. The captain organized a relief station and ended up extending aid to over 500 prospectors.

Captain Abercrombie's crews then set out to build the road to Copper Center. Working hard through the summer and early fall of 1899, they built a rough pack horse trail from Valdez some 93 miles to Willow Creek on the Copper River. Willow Creek was just a few miles south of Copper Center. This rough trail was the forerunner of the Valdez-Fairbanks Trail. The general path of the road ran from the military reservation at Valdez (construction of Fort Liscum started in the spring of 1900), up the Lowe River valley, through Keystone Canyon and Thompson Pass to the Tonsina Valley.

The expedition also reported that it was feasible to construct a railroad from Valdez to the Interior via Keystone Canyon and Thompson Pass. In the early 1900's, a syndicate headed by Morgan-Guggenheim interests searched for a rail route from their Kennicott Copper Mines in the area of the Chitina River, a tributary of the Copper River, to the coast. Surveys were made of the Thompson Pass/Valdez route, but the plan was abandoned in 1906 when the Copper River route was selected. In 1907, other promoters of the Keystone Canyon railway route ended their plans in violent disagreements. A steam locomotive and rails were shipped to Valdez, a line was partially built, as was a tunnel, but a railroad was never constructed over Thompson Pass.

Work continued on the Fort Liscum to Fort Egbert (Eagle) Trail in 1900. The trail was called the Trans-Alaska Military Road, by the military. Congress passed a bill in 1901 appropriating $100,000 for military roads and bridges in Alaska to be expended under the administration of the War Department. Practically all of these funds were spent by Captain Abercrombie on the Fort Liscum to Fort Egbert route which soon became known as the All-American Route to the Klondike and Yukon gold fields. The rough trail was completed between Fort Egbert (Eagle) and Fort Liscum. About 1906, the main trail was diverted at Gulkana (mile 128) by the Road Commission and directed toward Fairbanks. All future trail improvements and developments were made on the new alignment. The reason for this was the dwindling importance of Eagle and growing importance of Fairbanks on the Tanana River as a service area for the Yukon gold fields.

In 1904, Congress appropriated $25,000 more for surveys and development of the trail into a wagon road. In 1905, Congress supplemented that amount with another $5,700.

Back in 1902, the Army had sent Captain Wilds P. Richardson on his second tour to Alaska. He was stationed at Fort Seward, near Haines. When Congress directed the Valdez to Fairbanks wagon road survey, the military assigned Captain Richardson to that task, although Major John Mills had already investigated the feasibility of the route in 1905. He accomplished the survey of the approximately 365-mile long route from Valdez to Fairbanks during 1906-07. Congress then created the Alaska Road Commission (ARC) by an Act of January 27, 1905. ARC was under War Department administration and had Congressional authority and funds to survey and construct public wagon roads, trails, and bridges. Captain Richardson was appointed to head the Commission and stayed on from 1905 until leaving for a World War I assignment. In 1906, Congress appropriated $150,000 to begin work on the Valdez-Fairbanks wagon route. A later president of ARC, General James Steese, named the route the Richardson Highway in honor of the man who directed its construction.

Under Captain Richardson's direction, the Valdez-Fairbanks Trail was gradually improved. As early as 1906, at least 1,200 tons of freight and 2,000 people traveled the trail during the winter. In 1910, 3,500 people used the trail and over 2,400 tons of freight were hauled over it. Winter freight was handled by horse-drawn double bobsled. By 1911, it was passable for wheeled vehicles over its entire length. In 1912, over 1,700 head of cattle and sheep were driven over the trail. Another use of the trail was to move the mail. Mail left Valdez on the first and 16th of the month. The usual amount was 200 pounds, which was relayed five times in summer by pack horse and in winter by dogsled.

Eventually, the trail became a highway. During the summer of 1913, the first light automobile traffic traveled from Fairbanks to Valdez. After that event, most traffic over the trail was by motor vehicle. Winter mail was also carried part of the way by motor vehicle, covering 161 miles of the 365-mile long route.

Historic Trail Remnants

Little evidence of the original Valdez to Fairbanks Trail exists today except in the Lowe River valley and Keystone Canyon. As changes in the trail were made, turning it first into a wagon road, then into a motor vehicle route, and finally into a modern highway, major sections of the trail were obliterated. The Richardson Highway now

The present Richardson Highway through Keystone Canyon, north of Valdez, follows the old route. (Bureau of Outdoor Recreation) traverses much of the original route. However, because of terrain problems in the Lowe River valley and Keystone Canyon, realignments were made as the route was upgraded with the result that portions of the original trail remain intact.

Tools, implements, and equipment hauled over the old trail undoubtedly were lost or abandoned over the years. Such articles dating back to the 1900's and perhaps 1890's may still be present along the trail because of the relatively slow rate of oxidation and decomposition due to low precipitation and low mean annual temperatures along some trail sections.

Related Historic Sites

There are seven existing roadhouses located along the trail. These are Sourdough, Tazlina, Paxson, McCreary's, Poplar Grove, and Big Delta Roadhouses, and Black Rapids' Hunting Lodge. Sourdough Roadhouse is the only one still being used as a roadhouse and has been entered on the National Register of Historic Places. Approximately 56 historic roadhouses were reported to have been built and used along the Valdez to Fairbanks Trail. These are listed in the publication "Alaska's Historic Roadhouses" by Alaska Division of Parks (October 1974). Buildings associated with old Fort Liscum at Valdez still existed in 1974 but were removed when pipeline facilities were constructed at the site. A visitor center is planned at the site to cover the history of Fort Liscum. Remains of buildings and clay fireplaces stand at the abandoned settlement of Black Rapids.

The early towns along the trail still in existence include Valdez, Copper Center, and Fairbanks. Old Valdez was relocated to its present site, a short distance away, after the earthquake of March 1964. Due to the trans-Alaska oil pipeline location, the towns of Valdez and Fairbanks are in a boom situation.

Historical Significance

By comparison with the Yukon, Klondike, and other gold mining areas, the Copper River valley was not a major gold producer, nor did it attract as many people as the other areas. By 1970, the Copper River district had produced over 300,000 ounces of placer gold valued at more than $7.5 million, in comparison with the Fairbanks district which had produced just over 7,900,000 ounces valued at $250,300,000. However, other minerals, such as copper, proved to be an attraction only slightly less important.

Trail use to the various gold fields was light in relation to other trails of the period. Whereas over 22,000 people were reported to have crossed over the Chilkoot Pass Trail in 1897-98, only about 3,500 traveled over the Valdez Glacier Trail, and only a handful knew and used the route across Thompson Pass prior to 1897-98.

Although gold was the initial pulling force, the existence and importance of the Valdez-Fairbanks Trail continued because it was the route located entirely within Alaska. It started as a military trail to serve in protecting and establishing law and order and to aid in the passage of supplies and mail to the prospectors in the interior. It quickly became a public use route. As Alaska's population grew and other things drew people to Alaska, the trail was developed to serve Alaskans as the major multi-purpose road to the interior.

PRESENT AND PROSPECTIVE TRAIL USES

Present Trail Condition

Neither the main Valdez-Fairbanks Trail nor the winter alternate routes between the Little Delta and Delta Rivers or the Valdez Glacier Trail are currently being maintained as trails. Use of the main trail is obviously limited to motor vehicle use because the Richardson Highway covers most of the old trail. The only exception is in parts of the Lowe River valley and Keystone Canyon where the highway was not built over the trail. The Valdez Glacier Trail remains much as it was in the past. Since most of this trail crossed glaciers and waterways and is in an area not intensively used, little has changed its character. The Bernard Creek Trail receives some recreation use, while remaining essentially as it was during the Gold Rush period.

Scenic and Recreational Qualities

The Valdez-Fairbanks Trail offers a wide range of scenic vistas. Valdez, fronting on an arm of Prince William Sound and surrounded on other sides by the Chugach Mountains, is an area of spectacular beauty. Many of the rivers along the route, most notably the Lowe, Gulkana, and Delta, have high value.

Keystone Canyon, Thompson Pass, and Isabel Pass add further variety. The Alaska Range includes even more rugged peaks than the Chugach Range, including many of the highest mountains in North America. On the other hand, the Tanana River valley and parts of the Copper River valley lack distinctive visual appeal.

Most of the broad region extending between Valdez and Fairbanks has retained a wilderness character. The exceptions are along the route itself because of the Richardson Highway, the several towns strung out along the highway, and the trans-Alaska oil pipeline. Opportunities for recreating and viewing animals and plant communities in a natural setting are good.

Recreational Uses

The most significant recreation uses occurring along the route of the historic trail are driving for pleasure and sightseeing. Many nontrail-related recreation opportunities also are being enjoyed in the general area. State and/or Federal campgrounds are located near Gakona, Paxson, and Valdez. Fishing is good to excellent in the Gulkana, Delta, and Klutina Rivers and the tributaries to the Copper River, as well as nearby lakes. The Gulkana, Delta, and Copper Rivers offer recreational boating. Snowmobiling, cross-country skiing, hiking, and snowshoeing can be enjoyed along various sections of the trail area. Sport hunting, as well as subsistence hunting, and trapping occur throughout the trail area. The State of Alaska's Division of Parks has plans for a large state park within Keystone Canyon.

Nonrecreational Uses

The most significant, nonrecreation use of the trail route is the Richardson Highway. Another nonrecreation use of the trail area is the trans-Alaska oil pipeline. Future selections of public domain lands by Natives and the State could result in additional nonrecreation land use along the route.

CONCLUSIONS AND RECOMMENDATIONS

Qualification for National Scenic Trail Designation

The criteria used in evaluating the Valdez to Fairbanks Trail were as follows:

Criterion: Because of their special characteristics, National Scenic Trails should be nationally significant and be capable of attracting visitors from throughout the United States.

Finding: The overland trail from Valdez to Fairbanks and its surrounding gold fields and to the Copper River gold fields was traveled very lightly, even during the boom years. The Copper River district was quite modest in terms of numbers of stampeders, miners, and amount of production in comparison to other gold districts in Alaska, particularly the Fairbanks district. The high scenic values along portions of the route are of national significance and capable of attracting visitors from throughout the United States.

Criterion: National Scenic Trails are designated for hiking and other compatible uses. The National Trails System Act prohibits the use of motorized equipment on these trails except in certain circumstances.

Finding: The existence of the Richardson Highway over much of the historic trail route is a fact of life. Being a highway, motorized equipment is used on it. The development nearby of the oil pipeline is also incompatible with national scenic trail designation.

Criterion: National Scenic Trails of historical importance should adhere as accurately as possible to their principal historic routes.

Finding: The historic route of the Valdez to Fairbanks Trail is locatable and could be adhered to even though much of the route has been overlain by the Richardson Highway.

Criterion: National Scenic Trails should be provided with adequate public access through connecting local or regional trails. Access should be located at reasonable intervals to provide for trips of various lengths.

Finding: Due to the Richardson Highway, access is readily available along almost the entire route.

Criterion: National Scenic Trails should be primarily land based.

Finding: The route from Valdez to Fairbanks is land based.

Criterion: National Scenic Trails should be of sufficient length to encompass and provide appropriate access to the resources which are a basis for the trails designation.

Finding: The main historic trail was approximately 365 miles long. Secondary routes add an additional 135 miles.

Criterion: National Scenic Trails should be continuous except where no practicable or feasible interconnection exists.

Finding: A continuous trail following the historic route is not possible because the Richardson Highway has been superimposed over most of the distance.

Conclusions

Because the trail is overlain for the most part by a major highway, is paralleled by an oil pipeline, and does not have high potential for development as a hiking or similar use trail, its designation as a National Scenic Trail is not warranted. The trail was not as important as other routes during the Gold Rush Era.

Recommendations

It is recommended that no further consideration be given to the Valdez to Fairbanks route as a potential National Historic or National Scenic Trail. However, the various Federal and State agencies should continue to plan and develop, as needed, appropriate areas adjacent to the trail route, including trails from the Richardson Highway which would follow short segments of the historic route where possible, particularly in the Lowe River Valley, Keystone Canyon, and Bernard Creek Trail areas. These segments may qualify for designation as National Recreation Trails. Interpretation of the historic trail through the use of roadside markers along the Richardson Highway should also be considered.

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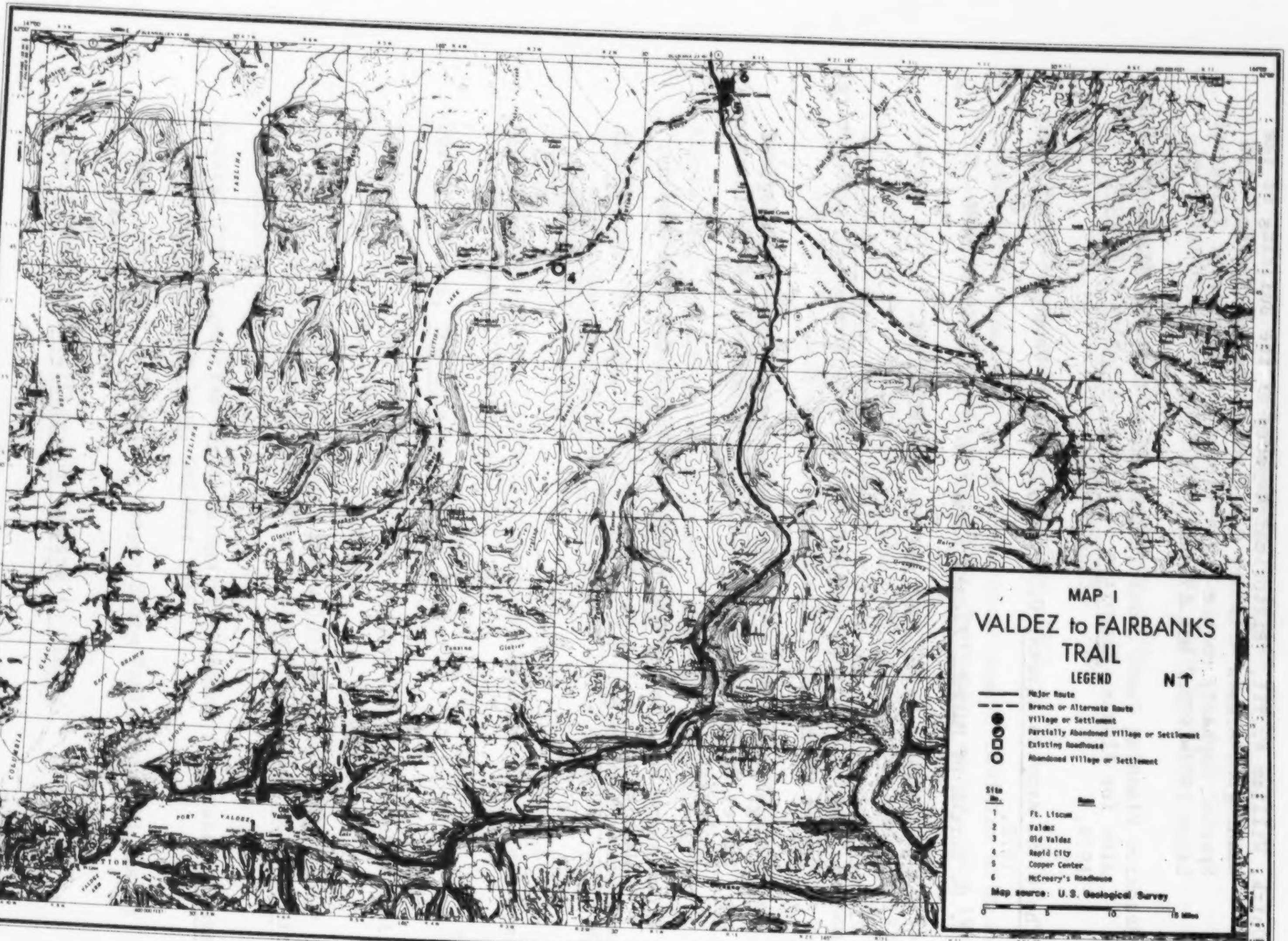
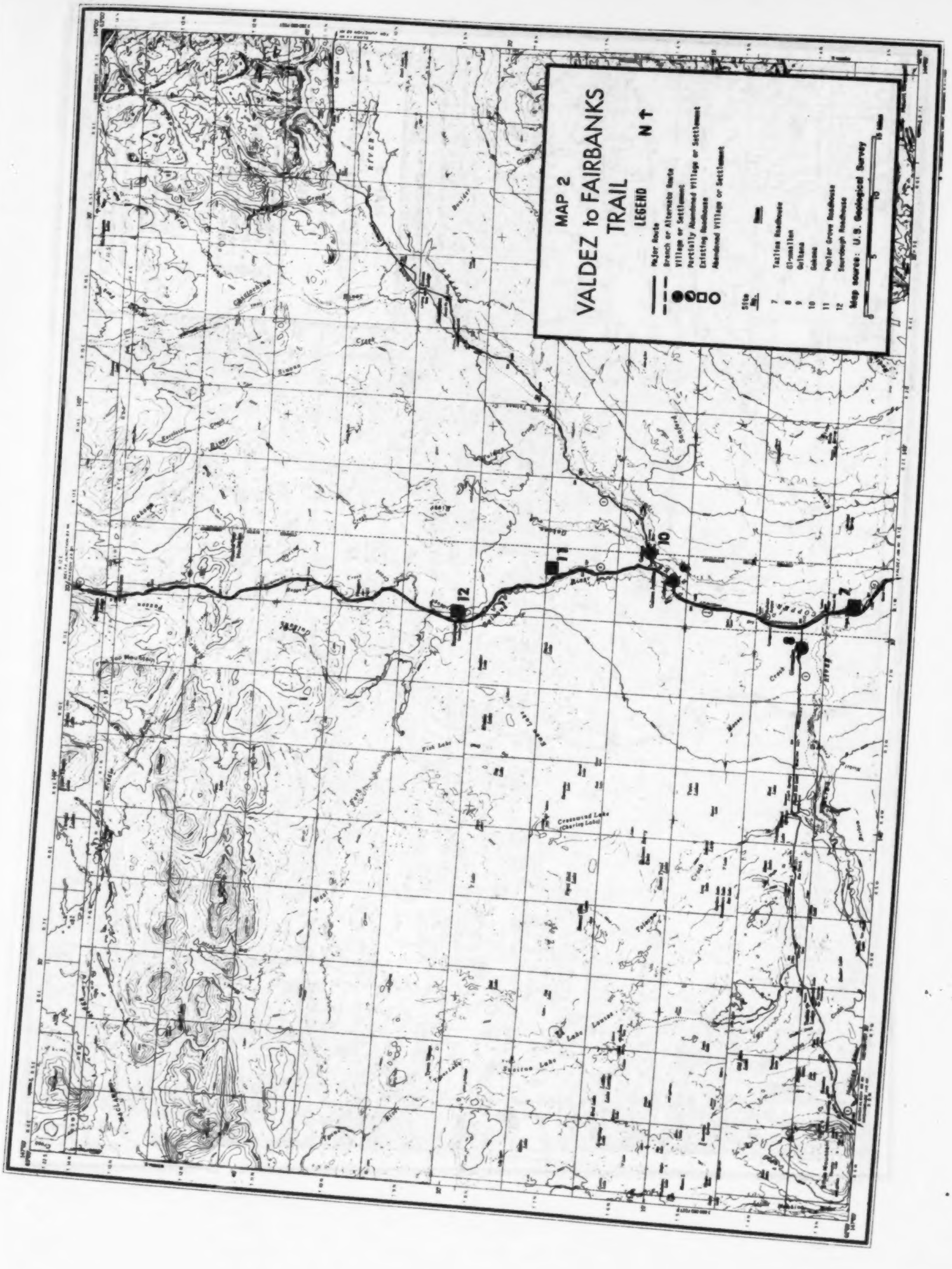
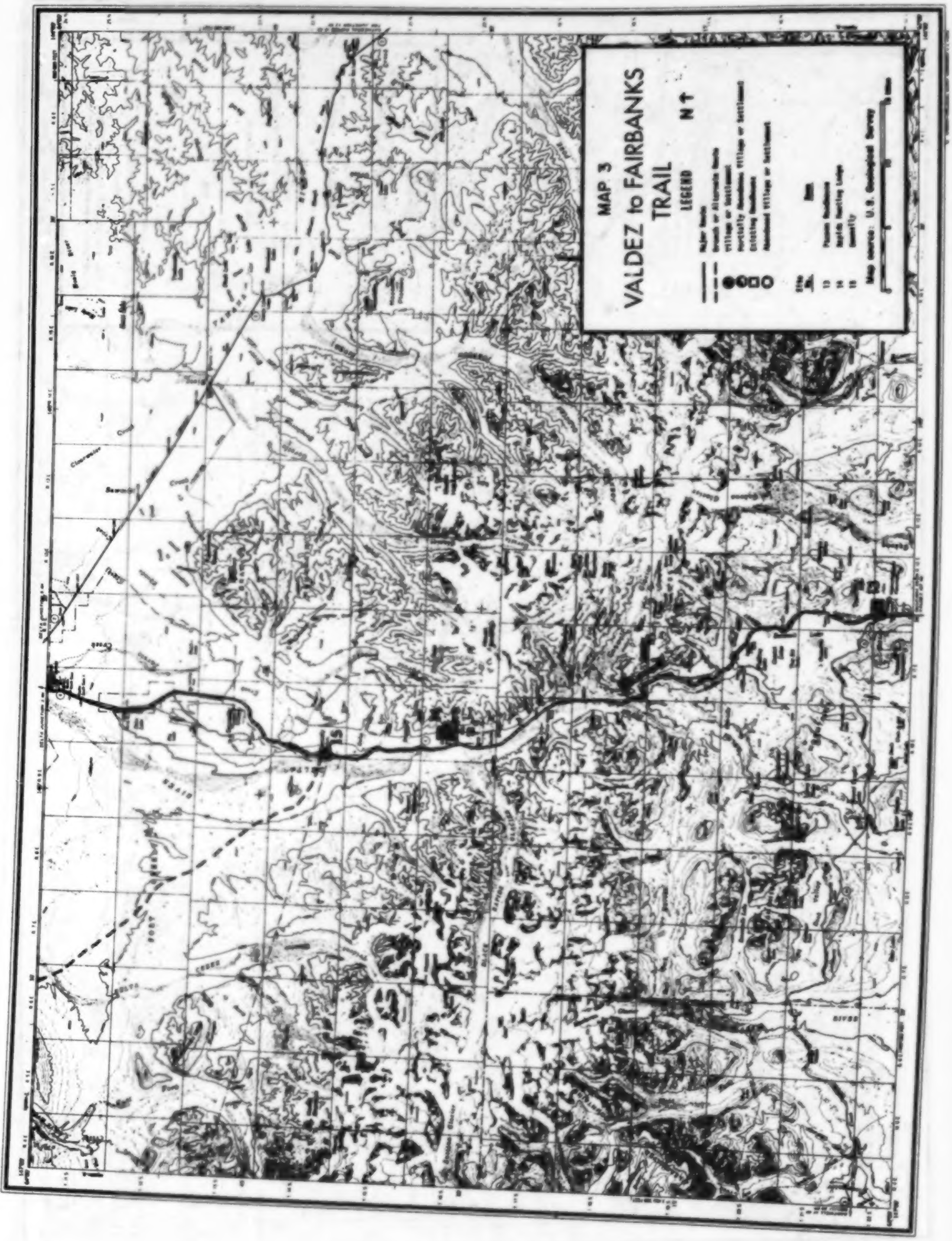
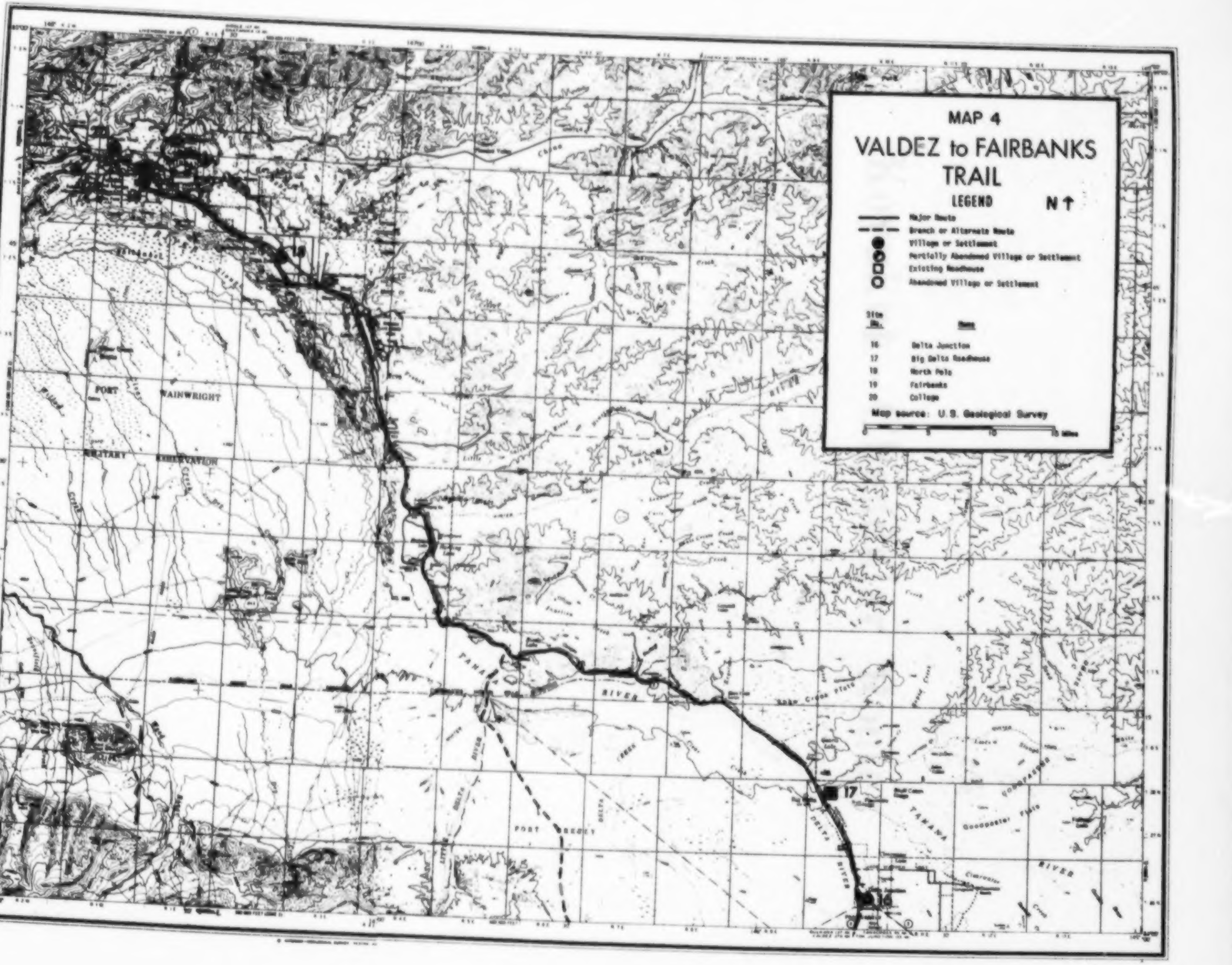
MAP I
VALDEZ to FAIRBANKS TRAIL
LEGEND
N ↑
Major Route
Branch or Alternate Route
● Village or Settlement
Partially Abandoned Village or Settlement
□ Existing Roadhouse
○ Abandoned Village or Settlement
Site No.
Name
1 Ft. Liscum
2 Valdez
3 Old Valdez
4 Rapid City
5 Copper Center
6 McCreary's Roadhouse
Map source: U.S. Geological Survey
0
5
10
15 Miles
TAZLINA
LAKE
TAZLINA
GLACIER
Tonsina Glacier
PORT
VALDEZ
COLUMBIA
GLACIER
4
5
6


MAP 2
VALDEZ to FAIRBANKS TRAIL
LEGEND
N ↑
Major Route
Branch or Alternate Route
Village or Settlement
Partially Abandoned Village or Settlement
Existing Roadhouse
Abandoned Village or Settlement
Site No.
7 Tazlina Roadhouse
8 Glennallen
9 Gulkana
10 Gakona
11 Poplar Grove Roadhouse
12 Sourdough Roadhouse
Map source: U.S. Geological Survey
0
5
10
15 Miles
1
7
8
10
11
12
Copper
River
Gulkana
Tazlina Lake
Crosswind Lake
Ewan Lake
Lake Louise
Susitna Lake
Tyone
Fish Lake
Boulder
Creek
River
Sanford
Chistochina


MAP 3
VALDEZ to FAIRBANKS TRAIL
LEGEND
N
Map source: U.S. Geological Survey


MAP 4
VALDEZ to FAIRBANKS TRAIL
LEGEND
N ↑
Major Route
Branch or Alternate Route
Village or Settlement
Partially Abandoned Village or Settlement
Existing Roadhouse
Abandoned Village or Settlement
Site No.
Name
16 Delta Junction
17 Big Delta Roadhouse
18 North Pole
19 Fairbanks
20 College
0
5
10
15 Miles
PORT WAINWRIGHT
MILITARY RESERVATION
FORT GREELY
TANANA RIVER
DELTA RIVER
16
17
18

Map source: U.S. Geological Survey

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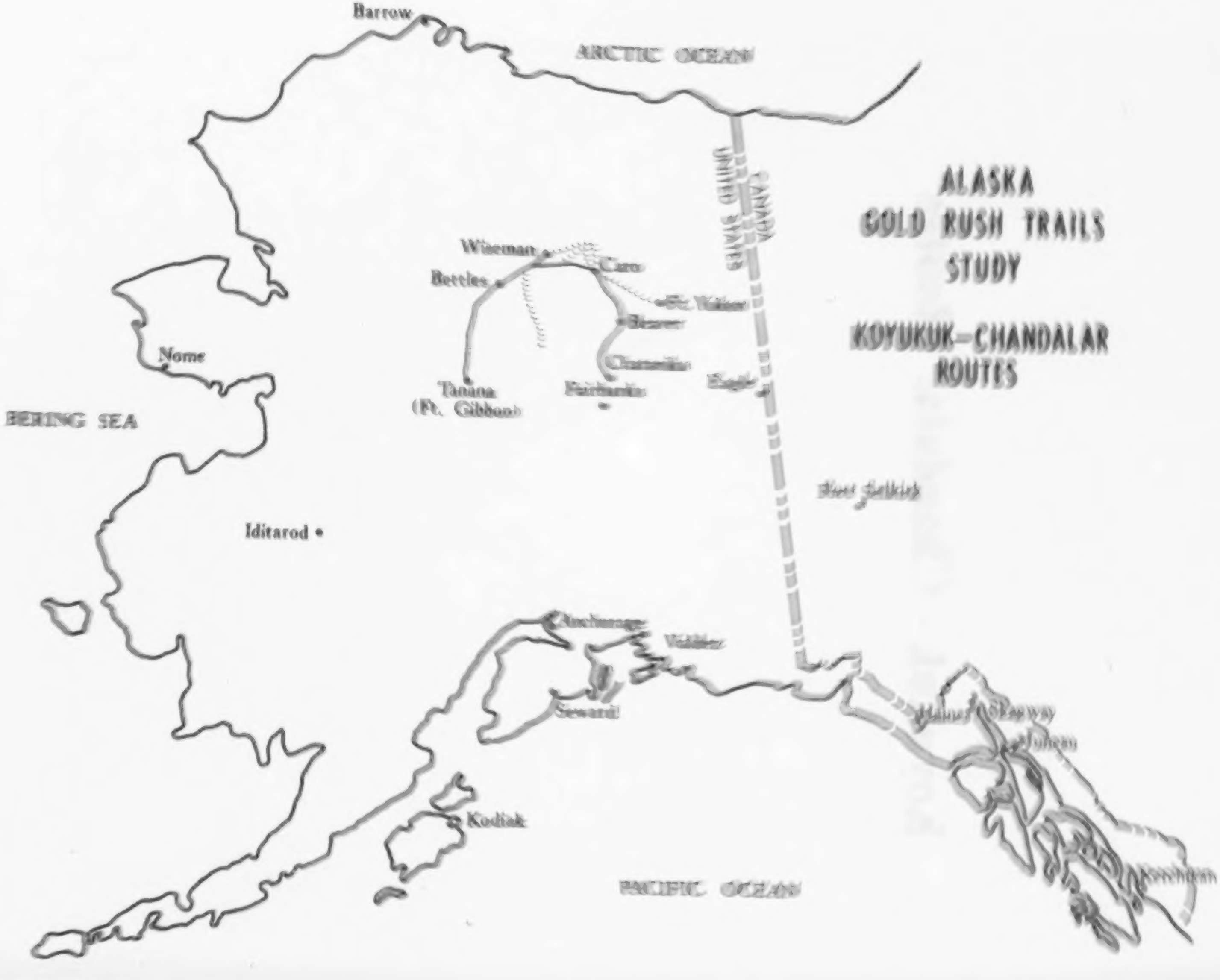
Koyukuk - Chandalar Routes



ALASKA
GOLD RUSH TRAILS
STUDY

KOYUKUK–CHANDALAR
ROUTES

Barrow
ARCTIC OCEAN
CANADA
UNITED STATES
Wiseman
Caro
Bettles
Ft. Yukon
Beaver
Chandalar
Tanana
(Ft. Gibbon)
Fairbanks
Eagle
Nome
BERING SEA
Fort Selkirk
Iditarod
Anchorage
Valdez
Seward
Haines
Skagway
Juneau
Kodiak
PACIFIC OCEAN
Ketchikan

KOYUKUK - CHANDALAR ROUTES

BACKGROUND

Lieutenant Henry T. Allen of the U. S. Army conducted the first official exploration in the upper Koyukuk River drainage. In 1885, he crossed overland from the Yukon River along the divide between the Tozitna and Melozitna Rivers, down the Kanuti River, and then up the Koyukuk River as far north as the John River confluence. That same year, Lt. Cantwell of the U. S. Revenue Marine Service traveled up the Koyukuk by steamer, then took skin boats up the Alatna River and portaged over into the Kobuk River drainage.

John Bremner, who had accompanied Allen on his expedition through Alaska, and a partner, Peter (or Peder) Johnson, were the first known prospectors in the upper Koyukuk in 1887. Although not documented, some people believe they found gold at Tramway Bar on the Middle Fork during that year. However, it was not until 1893 that the first paying gold was reported to be taken at Tramway Bar.

Between 1887 and 1897, only 18 to 20 prospectors were reported in the upper Koyukuk region. During that time, small amounts of gold were taken out of the Tramway Bar area and in the South Fork drainage.

With the Klondike Gold Rush in 1898, over 1,000 persons are reported to have taken steamers up the Koyukuk in search of gold in the upper drainage. Most were soon discouraged by the absence of bonanzas and by the remote, inhospitable country; and, according to Robert Marshall, author of Arctic Village, only 200 persons wintered over in the upper Koyukuk that year (Schrader reports 500 to 600) in the new towns of Arctic City, Bergman, Peavy, and camps along the South Fork.

When travel permitted in the spring of 1899, more left the Koyukuk district. Those who stayed were the more seasoned prospectors and their persistence quickly paid off when new strikes were made later that year on Slate Creek and Myrtle Creek, tributaries of the Middle Fork. Two new towns were founded: Slate Creek at that creek's confluence with the Middle Fork, and Bettles located just below the John River confluence.

In 1900, Bettles largely replaced the downstream town of Bergman as the major supply point for the upriver placer mines. The town of Slate Creek became known as Coldfoot, named after a cheechako, or newcomer, who upon reaching the Slate Creek diggings got cold feet and turned back.

Over the next few years, several hundred miners worked the placers of the Coldfoot area and in the North Fork and South Fork drainages of the Koyukuk. In 1906, a gold strike was made in the Chandalar district to the east and several hundred men, many from the upper Koyukuk, rushed to the new diggings around Chandalar Lake.

A new town of Caro was founded on the Chandalar River at Flat Creek. However, the cabins were deserted within 2 or 3 years and fewer than 50 men remained in the district when little gold was recovered.

During the winter of 1907-08, new gold discoveries were made on Nolan Creek north of Coldfoot and a reported 200 men rushed to the Koyukuk during the spring of 1908. In 1911, at about the time when the richer surface placers were nearly exhausted, deep placers were discovered in the Hammond River area. Spawned by this strike and continued activity in the Nolan Creek area, Wright's roadhouse at the confluence of Wiseman Creek and the Middle Fork grew into the town of Nolan. Mining in the Coldfoot area had declined steadily over several years and postal service was discontinued to Coldfoot in 1912. In 1923, the Nolan Post Office was officially renamed Wiseman, after the creek.

The primary mode of transportation to and from the Koyukuk district was by boat up and down the Koyukuk. However, some overland travel took place, especially in the winter months, and several trails were established. All the major overland routes began at various settlements along the Yukon River. An early route left Fort Yukon, followed the Chandalar River (originally reported as Chandlar) upriver, crossed a divide, and followed Slate Creek down to Coldfoot. Another early route left the Yukon near Fort Hamlin (downstream of Stevens Village), followed the Dall River upriver, crossed the divide to the South Fork of the Koyukuk, and then traversed the South Fork headwaters to Slate Creek and Coldfoot.

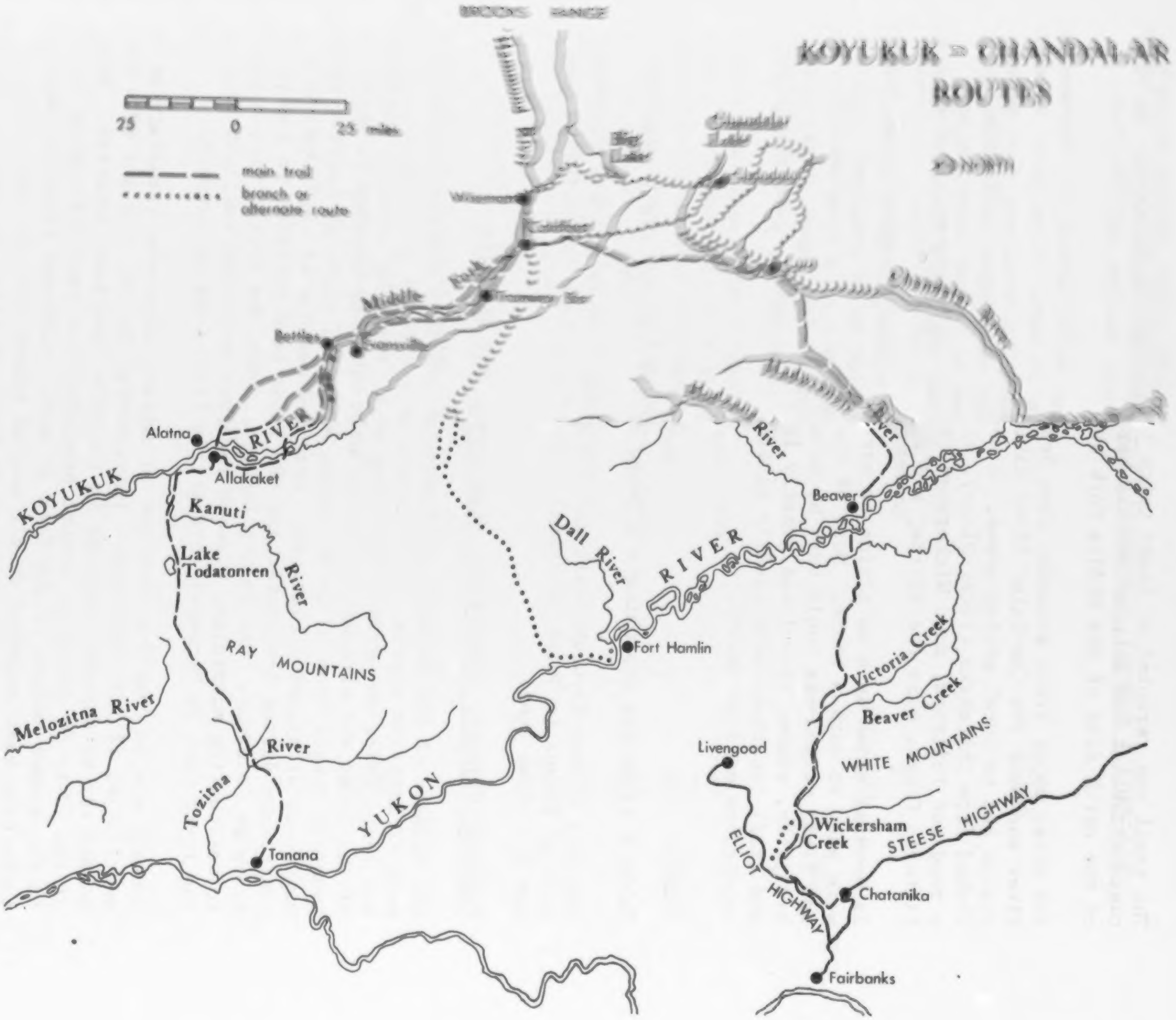
A somewhat later route established by the Alaska Road Commission (ARC) left the Yukon at Fort Gibbon at the confluence of the Tanana and went up the Tozitna River drainage, into Kanuti drainage, and then followed the Koyukuk upriver from near Allakaket to Bettles, Coldfoot, and Nolan. Another trail established by the Alaska Road Commission went north from Beaver on the Yukon to Caro on the Chandalar and then connected with local trails to mines in the Chandalar district and with the trail up the Chandalar River to the Koyukuk district. Trails also connected Fort Gibbon and Beaver with Fairbanks.

LOCATION AND REGIONAL ENVIRONMENT

General Alignment

The accompanying maps outline the known trails to the Koyukuk district or Wiseman area, and the adjacent Chandalar district.

Only two of these routes, both built by the Alaska Road Commission, can be considered major trails of the Gold Rush Era. The so-called Fort Gibbon-Koyukuk Trail left the Yukon River at Fort Gibbon, followed the Tozitna River, then its tributary Dagislakha Creek, over a divide and up the Melozitna River, past Lake Todatonten, down the Kanuti River, and up the Koyukuk to Allakaket, Bettles, Coldfoot, and Nolan (Wiseman).


KOYUKUK – CHANDALAR ROUTES
NORTH
25 0 25 miles
main trail
branch or alternate route
BROOKS RANGE
Hammond River
Big Lake
Chandalar Lake
Chandalar
Wiseman
Coldfoot
Middle Fork
Tramway Bar
Caro
Chandalar River
Bettles
Evansville
Hadweenzic River
Hodzana River
Alatna
Allakaket
KOYUKUK RIVER
Kanuti River
Lake Todatonten
RAY MOUNTAINS
Melozitna River
Tozitna River
Tanana
YUKON RIVER
Dall River
Beaver
Fort Hamlin
Victoria Creek
Beaver Creek
WHITE MOUNTAINS
Livengood
Wickersham Creek
ELLIOT HIGHWAY
STEESE HIGHWAY
Chatanika
Fairbanks

The trail was rerouted at least twice to make a more direct route between Allakaket and Bettles and was rerouted to follow better terrain on the north side of the Middle Fork between Bettles and Coldfoot.

The other major trail extended from Beaver north across the Hadweenzic River and over the Chandalar River divide to Caro. From Caro, several trails led to local mining areas. A connecting trail was also established from Chatanika (later Olnes), which was linked to Fairbanks by a road and railroad, down Wickersham Creek to Beaver Creek, across Victoria Creek, over the divide, and across the Yukon Flats to Beaver.

In several areas such as alpine or marshy places, tripods or stakes were used to mark a route. Most of these had to be replaced regularly and trail alignments could vary by as much as a mile from year to year. Similarly, winter travel was greatly influenced by local conditions and trail locations were readily altered from year to year if better conditions existed nearby.

Length

Table V gives the approximate mileage of the various trail segments.

The Fort Gibbon-Koyukuk Trail was 273 miles long from the present-day town of Tanana to Nolan (Wiseman). The route from Chatanika to Caro was 195 miles long.

Regional Climate, Topography, Vegetation, and Wildlife

The climate of the Koyukuk and Chandalar regions, similar to that of much of interior Alaska, is described as subarctic continental. Winters are long, dark, and severe beginning with freeze-up in early October of the lakes and streams and ending with break-up usually in May. Snowfall ranges from 50 to 80 inches annually, although heavier amounts may occur at higher elevations. Extended periods of -40°F to -60°F are common during the winter and -80°F has been recorded in recent years at Coldfoot. Due to its location above the Arctic Circle and to surrounding mountains, Wiseman receives no direct sunlight from the first week in December through the first week in January.

Summers are in complete contrast to winters with warm temperatures and little, if any, darkness. Temperatures in the 70's and 80's are common and occasional readings in the 90's have been reported. Most of the 10 to 20 inches of annual precipitation over the region falls in the summer months in the form of rain. Although freezing temperatures have been reported in all months except July in most areas, a frost-free season generally extends from the first of June to the end of August.

Permafrost, either continuous or discontinuous, underlies much of the region except along streams and on some favorable south-facing slopes.

TABLE V. Mileages of Various Trail Segments: Koyukuk - Chandalar Routes

	MILES	
Major Segments		
Fort Gibbon (Tanana) - Allakeket - Bettles - Coldfoot - Nolan (Wiseman)	273	
Chatanika - Beaver - Caro	195	
Subtotal		468
Other Segments		
Caro - Flat Creek (to Little Squaw Creek)	45	
Caro - Coldfoot (via West Fork)	85	
Caro - Coldfoot (via Crooked Creek)	90	
Caro - Big Creek (to Little Squaw Creek)	48	
Caro - Chandalar Lake	50	
Chandalar Lake - Little Squaw Creek	60	
Fort Yukon - Caro	15	
Fort Hamlin - Coldfoot	110	
Subtotal		503
Connecting Trails and Roads		
Fairbanks - Fort Gibbon	120	
Fairbanks - Chatanika (by railroad)	32	
Subtotal		152
TOTAL		1,123

North of Bettles and Caro, the hills and rugged mountains of the Brooks Range dominate the landscape. Relief is great with peaks rising 2,000 to 3,000 feet above the many broad, glacially-carved valleys which lace the Range. The elevation of Caro is approximately 1,000 feet, Wiseman 1,200 feet, and Bettles (new town) about 650 feet.

The Kanuti Flats is the dominant topographic feature between Bettles and the Kanuti River. Relief is generally low with occasional hills and ridges rising 1,000 to 1,200 feet in elevation.

The Ray Mountains and associated hills to the west divide the waters flowing into the Koyukuk from those rivers flowing south directly into the Yukon, such as the Melozitna and Tozitna. These mountains and hills are much less rugged than those of the Brooks Range, having more gently sloping sides and little exposed rock surfaces. The divide crossed by the Fort Gibbon-Koyukuk Trail is approximately 1,200 feet in elevation, although nearby peaks in the Ray Mountains rise to over 3,000 feet. After dropping down into the low valley of the Tozitna River, the trail climbs to over 2,000 feet before dropping down to the present town of Tanana along the Yukon River (elevation about 200 feet).

South of Caro, the Beaver-Caro Trail climbs to over 2,400 feet in crossing the rounded low mountains which form the divide between the Chandalar River and the Hadweenzic River drainage. Nearby mountains rise to only several hundred feet above the trail. Between this divide and Beaver, relief is moderate with the trail intersecting east-west trending ridges and tributaries of the Hadweenzic.

The village of Beaver is located in an immense area known as the Yukon Flats at an elevation of 362 feet. The White Mountains separate the Yukon Flats from the Tanana River lowlands of the Fairbanks area. After crossing the Flats, the old Chatanika-Beaver Trail climbs to over 2,000 feet in crossing the Victoria and Beaver Creek drainages. The Chatanika area north of Fairbanks is characterized by high hills and ridges rising 1,000 to 2,000 feet above stream valleys.

Vegetation over the region varies greatly due to topography and the absence or presence of permafrost. Along the Koyukuk River and its upper tributaries and along the Tozitna River, a bottomland spruce-poplar forest is found. Major trees include white spruce and balsam poplar. On gently rising slopes above the river valleys, an upland spruce-hardwood forest generally exists consisting of the various tree species, but dominated by large areas of black spruce and open marsh or muskeg. Alpine and moist tundra are found in the higher divide area between the Kanuti and Tozitna drainages, just north of Tanana, and on many of the mountain slopes in the Brooks Range. Treeline generally ranges between 2,000 and 2,500 feet.

The mountain area between Wiseman and Chandalar Lake is largely vegetated with tundra and willow plants with only occasional sparse stands of white spruce. South of Chandalar Lake, the river valleys of the Chandalar River drainage are largely covered by either a bottomland spruce-poplar forest or an upland spruce-hardwood forest.

A short section of alpine tundra is crossed in the divide between the Chandalar and Hadweenzic Rivers. Heavy upland spruce-hardwood and lowland spruce-hardwood forests dominate the area north and south of Beaver with an intervening section of bottomland spruce-poplar forest along the trail route to Chatanika.

Large game animals are common throughout the region, although most populations are sparse in relation to land area because of the harsh climatic conditions and absence of available winter food. Caribou, moose, Dall sheep, black bear, brown/grizzly bear, and wolves are locally present in varying populations. Small fur-bearers including lynx, beaver, mink, land otter, weasel, marten, and muskrat are abundant over much of the region at lower elevations.

Important waterfowl nesting areas are located in the Kanuti Flats and Yukon Flats. Common raptors in the region include northern bald eagle, golden eagle, osprey, rough-legged hawk, goshawk, marsh hawk, great horned owl, great grey owl, and others. Gyrfalcons are occasionally observed in the higher regions of the Brooks Range and the endangered peregrine falcon is present in the region.

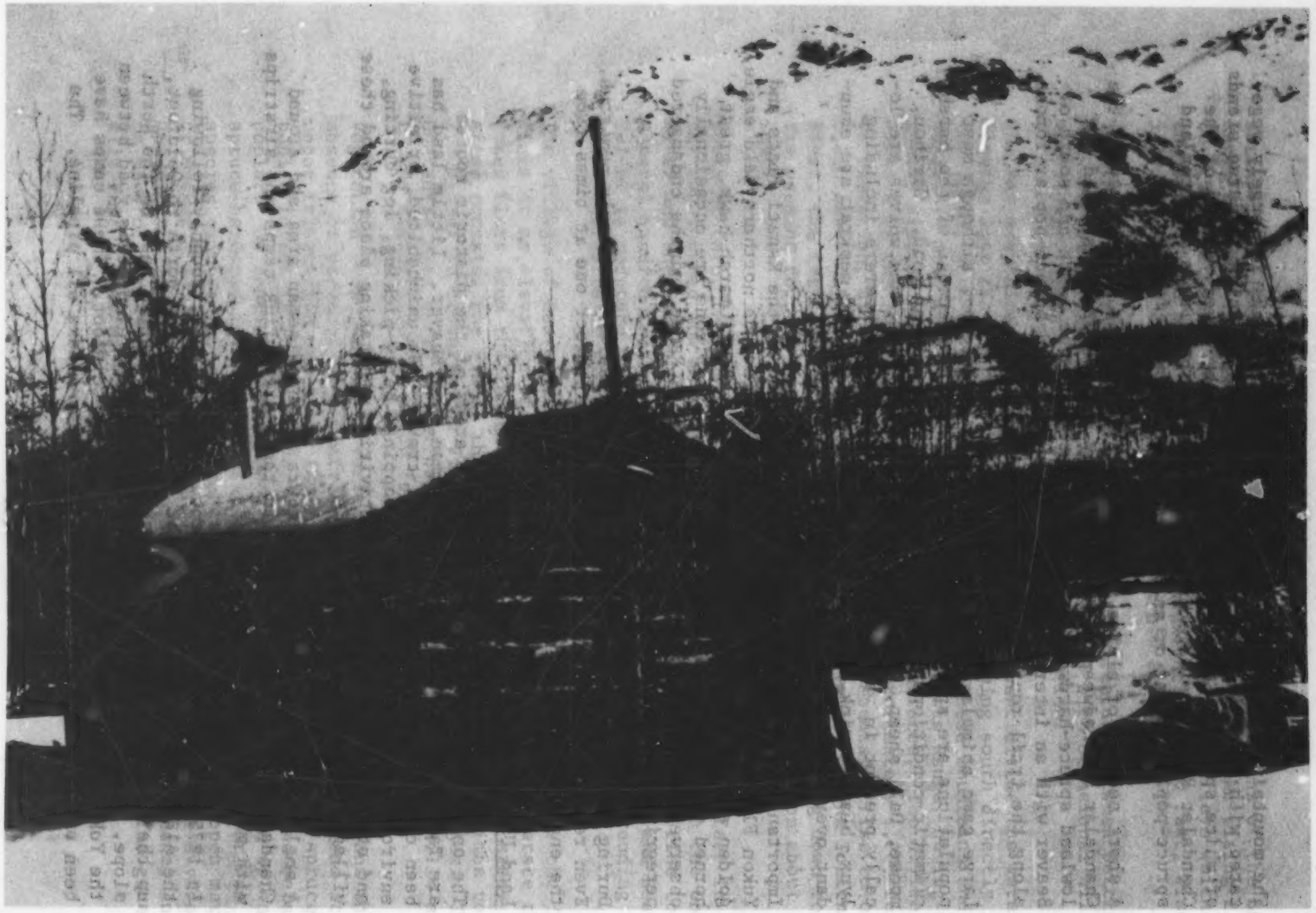
During the summer, mosquitoes and biting flies are extremely numerous. Even repellents and head nets cannot fully protect one at times from the endless attack.

Land Uses and Access

The only permanent settlements in the areas of the historic routes are Tanana, Allakaket, Bettles, Wiseman, and Beaver. Little land has been cleared and most of the routes traverse an uninhabited, primitive environment. Hunting, fishing, trapping, berry-picking, log cutting, and other subsistence-oriented activities are taking place around these villages.

A small amount of mining still occurs in the Wiseman area and around Chandalar Lake. Tractor trails in these areas link camps and airstrips with mining and prospecting areas.

In 1975, an all-weather gravel road was completed, roughly following the old Dall Creek Trail from the Fort Hamlin area north to Coldfoot, up the Middle Fork, past Wiseman, and over Dietrich Pass to the north slope. Several construction camps are located along this road between the Yukon River and Dietrich Pass, and at Coldfoot. These camps have been used in the construction of the trans-Alaska oil pipeline. The



One of several residences at Wiseman. The pipeline haul road passes at the base of the mountain in the background. (Bureau of Outdoor Recreation) road parallels the pipeline and connects with the existing Elliott Highway from Fairbanks at Livengood.

Tanana, Allakaket, Bettles, and Beaver are served by regular commercial air service and many additional airstrips for bush pilots exist in the region. The pipeline camps are also presently served by commercial air service. Charter air service is available at Bettles.

General Land Ownership

Virtually all of the land traversed by the several routes to the upper Koyukuk and Chandalar areas is currently in Federal ownership, managed by the Bureau of Land Management.

Twenty-five townships surrounding the villages of Bettles (Evansville), Allakaket, Tanana, and Beaver have been withdrawn for Native selection. Between the Native selection areas of Tanana and Allakaket, much of the route area has been classified as public interest lands under Section 17(d)(1) of ANCSA. Much of the White Mountains area is similarly classified. These (d)(1) lands are withdrawn from all forms of appropriation under the public land laws, including the mining and mineral leasing laws except for the location of metalliferous minerals.

The Middle Fork of the Koyukuk Valley has been withdrawn as a utility corridor. The Chandalar area east of the utility corridor within the Brooks Range has largely been selected by the State of Alaska and is pending receipt of patent.

Between the Chandalar River and the White Mountains, much of the route area has been withdrawn under Section 17(d)(2) of ANCSA and is proposed for inclusion in the Yukon Flats National Wildlife Refuge. These lands are withdrawn from all forms of appropriation. A similar (d)(2) corridor, 2 miles wide, has been withdrawn along Beaver Creek within the White Mountains. This river is proposed for inclusion in the National Wild and Scenic Rivers System.

In the Chatanika area and south to Fairbanks, lands have been either patented to the State or are pending transfer of patent from the Federal government.

An area of the central Brooks Range immediately adjacent to the west boundary of the utility corridor is classified under (d)(2) and has been proposed for inclusion in the Gates of the Arctic National Park. This proposed parkland encompasses lands in the North Fork of the Koyukuk drainage within about 10 miles of Wiseman.

Native land selections continue, action on proposed additions to the national conservation system are to be taken by December 1978, and all State land selections made by 1985.

The Fort Gibbon-Koyukuk Trail, the Chatanika-Beaver Trail, the Beaver-Caro Trail, and the Caro-Coldfoot Trail were part of the territorial system of roads and trails and were constructed and maintained by the Alaska Road Commission using Federal and/or territorial money. The State of Alaska maintains that a right-of-way still exists in the name of the State along all such roads and trails pursuant to revised Statute 2477 authorized by Congress in 1866.

The current Bureau of Land Management land status records show a reservation under 44LD513 (Department of the Interior land decisions) for most of the historic routes to and from the Wiseman and Chandalar area. As such, these trails would be reserved for public purposes in Federal ownership should patent be transferred.

HISTORIC RESOURCES

Period and Type of Use

Some remarks by F. C. Schrader of the U. S. Geological Survey following his visit to the Chandalar and Koyukuk districts in 1899 aptly describe travel in the region:

> The Chandler (sic) and Koyukuk River regions form no exception to the rule of Alaskan travel. The almost invariable means is by boat or canoe along the waterways in summer, and overland by trail with the use of dog sleds (sic) in winter. The term "trail" as used in Alaska, refers more particularly to the passable condition of the country than to any foot-beaten path or well-worn line of travel. This is especially true of the Chandler (sic) and Koyukuk regions.

Most of the early stampeders and subsequent movement of supplies to the Koyukuk district came up the Koyukuk River by steamer to the head of navigation at Bergman and later Bettles. From there, people and goods transferred to horse-drawn scow or pole-boat and were taken upriver to Coldfoot or Nolan (Wiseman). Supplies often were stored until winter when they were taken upriver from Bettles by horse-drawn sled or dog team.

In the early days of the Koyukuk boom, some overland summer travel took place along the Dall Creek divide route from Fort Hamlin on the Yukon to Coldfoot. However, even by 1909, Maddren of the U. S. Geological Survey described this route as poorly marked and little used. Horses and a few cows were reported taken over this route.

There was also a trail used in the early stages of gold discovery that followed the Chandalar River up from Fort Yukon to the West Fork over the divide, across the South Fork of the Koyukuk headwaters, and down Slate Creek to Coldfoot. This was reported to be used in both summer and winter. Maddren reported that winter and summer mail was carried to Coldfoot over this route from Fort Yukon prior to 1906. Because steamers reached Bettles during the summer, it is doubtful that much mail was carried up this route in summer.

In 1906, winter mail was carried north by dog team from Fort Gibbon on the Yukon to the upper Koyukuk following a route up the Tozitna River drainage, over the divide to Allakaket, and up the Koyukuk to Bettles, Coldfoot, and Nolan. Over the next several years, the Alaska Road Commission worked on the trail and finished it to winter trail standards in the winter of 1909-10. By 1917, the section between Bettles and Nolan had been upgraded to winter sled road standards. Horses as well as dogs were used to carry freight over this sled road.

Although steamers were taken up the Chandalar River, they could only ascend about 70 miles, or about 40 miles short of Caro and 75 miles from the mines. Thus, during the winter of 1909-10, work began on a trail from Beaver to Caro to better supply the Chandalar mining district. Over the next several years, a winter sled road was constructed which was also suitable for summer pack horses. By 1924, the sled road had been constructed to summer wagon road standards.

Frank Yasuda, a trader and prospector, and his partner Thomas Carter, upon hearing about the proposed ARC route, made plans for Yasuda to build a place where they thought the road would come out. Twenty-nine Mile Hill was used as a landmark. In 1910, Yasuda and his Eskimo wife, Nevelo, were living in Beaver along with James Mennano and his Eskimo wife and a third Eskimo family. During the years following the establishment of Beaver, Eskimos were employed by the Alaska Road Commission in building bridges and cabins.

Over the winters of 1911-12 and 1912-13, a winter trail was constructed from Chatanika to Beaver to link up with the Caro trail. This trail received little subsequent use or maintenance, but was brushed out and shelter cabins erected and restored again during the winter of 1923-24.

Although used by early mail carriers and miners, the Coldfoot-Caro trail did not receive any attention from the Alaska Road Commission until the winter of 1923-24 when the route was brushed out, tripods erected, and shelter cabins and river tramways erected. This improved trail was passable by dog teams in winter and by foot in summer.

Several routes and trails were established during and after 1906, between Coldfoot and the Chandalar diggings and to the mining areas from Caro. During the rush of 1906, over a hundred men were reported to have left the Koyukuk diggings to seek bonanzas on Big Creek, Little Squaw Creek, and Big Squaw Creek in the Chandalar Lake area. The route generally taken between the two districts left the old Fort Yukon-Coldfoot route near the Boulder Creek confluence with the South Fork of the Koyukuk, ran down Crooked Creek, up the Chandalar to Chandalar

Lake, and up Tobin Creek to the mining areas. Other routes were developed by the miners to and from the supply point at Caro. One route went up the Middle Fork of the Chandalar and down Grave Creek to the mines. Another followed Big Creek and over a divide into Little Squaw Creek.

The amount of use on the various trails generally corresponded to the amount of activity in the gold districts during a given year and to the physical development of a trail or sled road. The first significant rush utilizing the winter trails to the Koyukuk occurred in February and March of 1900 following the reports of major strikes on Myrtle and Slate Creeks. An estimated 200 people came up from Fort Yukon and from Fort Hamlin, overland to Coldfoot. Several hundred rushed to the Chandalar strikes in 1906. Although many came from the Koyukuk district and others came up the Chandalar by boat, others probably followed the old summer and winter trail up the Chandalar River from Fort Yukon.

Before break-up in 1908, approximately 200 prospectors again headed for the Koyukuk when news of the Nolan Creek strike came out. By this time, the trail up the Tozitna drainage was in use and many probably came north from Fort Gibbon. The Hammond River discoveries in 1911 again sparked trail activity to and from the Koyukuk.

However, in most years, mail delivery and the semi-annual migration of miners and prospectors constituted the mainstay of trail use. When the mail route was established on the Fort Gibbon-Koyukuk Trail in 1906, and Alaska Road Commission work on the trail began, that trail soon attracted additional travelers who may have otherwise taken a steamer. Similarly, the completion of the ARC trail and later sled road to Caro from Beaver soon became the primary route of overland travel to the Chandalar district and encouraged greater amounts of traffic than otherwise may have occurred with merely an unmaintained route.

Production and, hence, trail activity declined substantially after 1917 in the Koyukuk district. World War I and the attraction of many away from the gold fields in Alaska, the exhaustion of economically mined placers, and even prohibition are pointed to as reasons for this decline. Although a few persons continued to operate small placers, the Gold Rush Era was largely over in the Koyukuk by 1920.

The Chandalar district held more continued hope and less actual production than perhaps any other in Alaska. After the initial rush of 1906, fewer than 50 people ever worked the mines in a given year. The discovery of lode deposits prompted trail and sled road construction for the movement of necessary equipment, yet relatively little use was actually made of these developments. Ironically, it was not until the early 1920's, after the gold rushes, that the greatest gold production was reached. The boost in production in 1922 prompted the ARC to upgrade the existing trails and sled roads in the area. However, little further use was made of them as gold production again sagged by the close of the 1920's and the air-age came to Alaska. The Caro Post Office, established in 1907, was discontinued in 1912.

Historic Trail Remnants

Many of the historic trails in and to the Koyukuk and Chandalar areas continued to be used after the Gold Rush Era by people employing dog teams, horsedrawn wagons and sleds, tractors, ATV's (all-terrain vehicles), and snow machines. Thus, trails over many of the old routes are still very evident.

The old route from Fort Gibbon to Bettles can be followed for most of its distance. This route has been traveled since the early mining days by vehicles and a track approximately 8 to 10 feet wide is visible, especially through forested or brushy areas. The segment between Allakaket and Bettles, realigned from the original trail, is heavily used by local residents on snow machines in the winter.

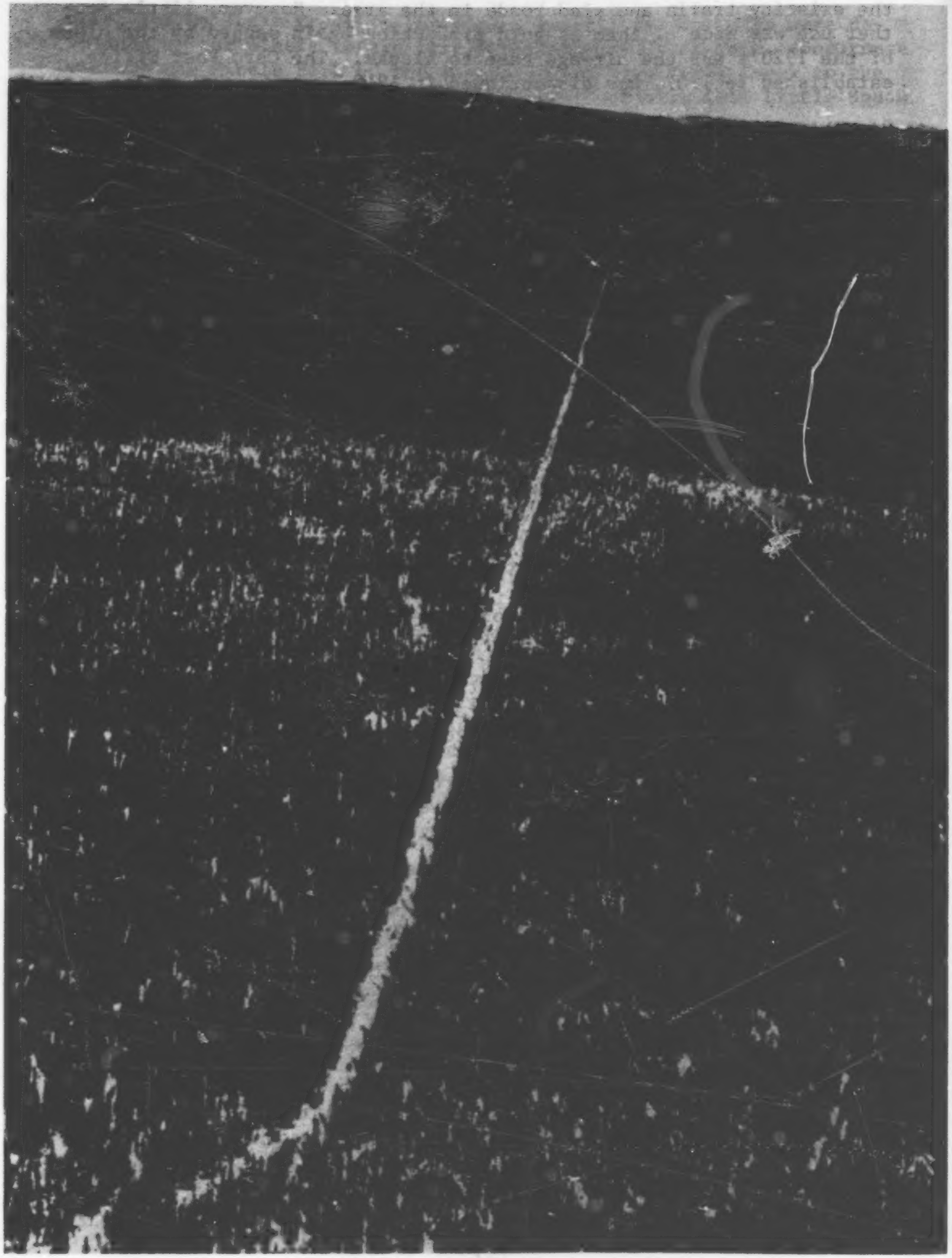
Several old and modern tractor trails exist between Bettles and Wiseman, one of which probably was superimposed on the old trail and the later sled road. From Coldfoot to Wiseman, a new gravel road was built along the Middle Fork to aid construction of the trans-Alaska oil pipeline.

Most of the old trails between Coldfoot and the Chandalar area and between Caro and the mines have been traveled in recent years by caterpillar tractors and other vehicles and cleared stretches through trees and brush are in evidence. As in the case of the Koyukuk trails, most of this travel has been in the winter months and low-growing brush and tundra vegetation forms the bed of most of these trails.

The wagon road which was developed from Beaver to Caro is still visible with little obstruction to winter travel. A wide roadbed of perhaps 20 to 30 feet exists along the entire route.

The Chatanika-Beaver trail is the least altered segment of the original Koyukuk-Chandalar routes but, at the same time, the least visible. Developments in the Fairbanks area and the construction of the Steese and Elliott Highways obliterated the original trail from Chatanika to about mile 22 of the Elliott Highway. From that point, the old route has been used in recent years by snowmachiners to the Big Bend area of Beaver Creek. Beyond, the old trail can be seen only faintly in a few places as it proceeds north along Beaver Creek, up over a divide, across Victoria Creek, over another divide, and across the Yukon Flats to Beaver.

Shelter cabins were erected at intervals along those trails and sled roads constructed by the Alaska Road Commission. Several of these cabins are still standing along the Beaver-Caro wagon road and along



Old route now used by "Cats" between Beaver and Caro.
(Bureau of Outdoor Recreation)

the Chatanika-Beaver Trail. Cabins may also be present between Caro and Coldfoot and between Tanana (Fort Gibbon) and Allakaket.

Tools, implements, and equipment hauled over the old routes undoubtedly were lost or abandoned over the years. Such articles dating back to the late 1890's may still be present along the trails because of the relatively slow rate of oxidation and decomposition due to low precipitation and low mean annual temperatures.

Related Historic Sites

No sites associated with these routes have been placed on the National Register of Historic Places. However, the historical resources of the town of Wiseman have been studied by the Bureau of Land Management and a nomination to the National Register is contemplated. Wiseman currently has a population of between five and ten. Several cabins and buildings at the townsite may date back to the early gold mining days.

A pipeline construction camp is located on the site of Coldfoot and no historic buildings remain.

Although the population dwindled steadily, some persons remained in Bettles until the middle 1950's. However, with the development of a major airfield in 1945 and the new town of Bettles 5 miles upriver from the historic townsite, old Bettles became a ghost town. Many old structures and implements are still present.

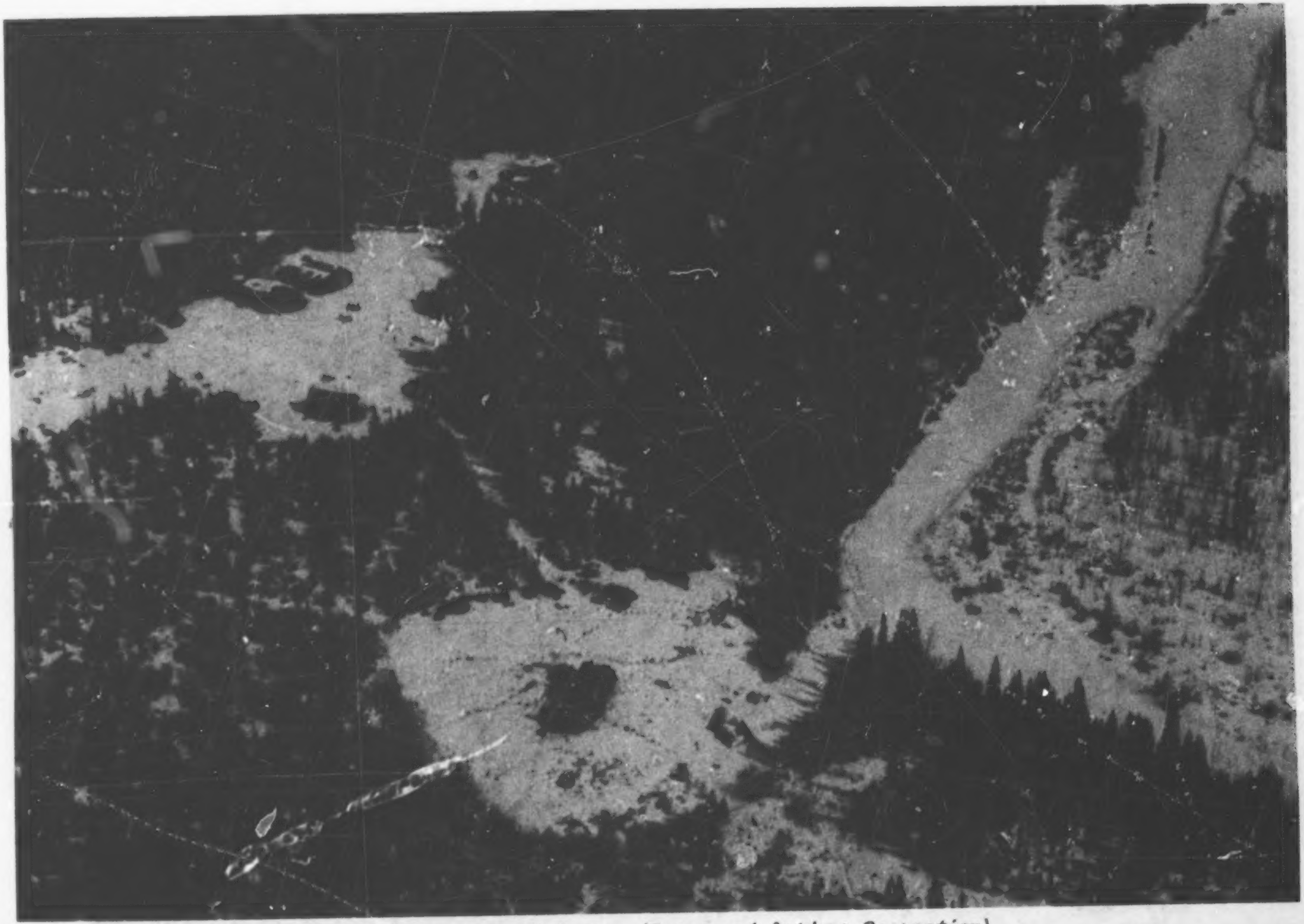
Several old buildings dating back to the 1906 rush to the Chandalar area are also still standing at the deserted site of Caro on the Chandalar River.

It is not known if any evidence of historic Fort Gibbon or Fort Hamlin on the Yukon River exists. Similarly, evidence of the settlements of Bergman, Arctic City, and Peavey on the Koyukuk and several camps on the South Fork is uncertain.

Historical Significance

In relation to other gold mining areas of Alaska and the Yukon, such as the Klondike, Nome, Fairbanks, and Iditarod, the Koyukuk and Chandalar districts were not major gold producers, nor did they attract as many people as the other areas. Trail use to the Koyukuk and Chandalar areas was correspondingly light. Only perhaps 200 persons utilized the Koyukuk trails in a peak year. The use of steamers on the Koyukuk also contributed to the light use of overland routes.

Total placer gold production by the Koyukuk district by 1970 amounted to just over 300,000 ounces or slightly more than $7 million. Chandalar production amounted to only 29,760 ounces or $780,000. Some additional gold in the form of lode deposits was produced in the Chandalar district.



Historic mining town of Caro. (Bureau of Outdoor Recreation)

The Koyukuk production represents approximately 2.3 percent of the placer production in the Yukon region of Alaska and about 1.4 percent of the total Alaskan production. Combined with the Chandalar, Koyukuk production amounted to 2.5 percent of the Yukon region and 1.6 percent of the Alaskan totals.

However, the Koyukuk was by far the most important district north of the Arctic Circle. The Koyukuk and Chandalar districts presented perhaps the greatest challenges and hardships for gold seekers in Alaska and the Yukon. The remoteness and severe environment were major obstacles to the prospecting and working of claims. The cost of equipment and supplies in the Koyukuk and Chandalar districts was among the highest in Alaska, due to the extremely long distances involved and the several breaks in the route. It is estimated that costs involved in mining reduced the profits from gold produced by 50 percent.

The trails leading to these districts were among the most northerly continuous trail connections in Alaska, stretching 200 air miles north of Fairbanks and 80 air miles north of the Arctic Circle (approximately 67° N. latitude). The mail carriers, miners, and others who mushed these lonely trails, with temperatures commonly 40 to 60 degrees below zero, demonstrated a rare determination and ability to survive incredible hardships.

PRESENT AND PROSPECTIVE TRAIL USES

Present Trail Condition

None of the historic route segments are currently being publicly maintained as trails. Yet, many of the various segments continue to be used and are discernable and passable in winter over large sections. Summer vehicular use and even pedestrian use is limited to only a few short discontinuous segments due to the presence of low brush, tussocks, muskeg and marshy areas, stream crossings, and other obstacles.

The recently constructed gravel road from the Yukon River to Alaska's North Slope is superimposed or closely parallels the old Dall River route to Coldfoot and the sled road from Coldfoot to Wiseman.

Scenic and Recreational Qualities

Most of the route segments from the Yukon River to the base of the Brooks Range near Coldfoot and Caro possess moderate scenic values. In comparison to other areas of Alaska, the low mountains, ridges, and flats of the Yukon River interior are not generally thought of as having special beauty or distinctive visual features.

The Brooks Range, on the other hand, possesses exceptional scenic values and has received considerable acclaim for its stark, rugged beauty. Broad, low-lying forested valleys dramatically contrast with the sweeping alpine tundra and barren rock outcroppings on steeply pitched adjacent slopes and towering peaks. The numerous clear-water rivers and streams contrast sharply with the milky, glacial rivers so common in other major mountain ranges in Alaska.

The historic route between Coldfoot and Caro and between Coldfoot and Chandalar Lake is highly scenic, especially in the Slate Creek divide area. However, much of this route is located along the rivers within very broad valleys on the southern flank of the Brooks Range. Many other areas of the Brooks Range are of greater scenic value, including the more modern local mining trails located north of the Coldfoot-Caro route in the Big Lake vicinity. In this area and in others in the Brooks Range, valleys are narrower, peaks are higher, and a greater sensation of being in the mountains exists.

Another segment of high scenic value exists along the old Chatanika-Beaver Trail between the Elliott Highway and the southern edge of the Yukon Flats. The old trail through the Beaver and Victoria Creek areas traverses a variety of vegetative zones from large white spruce forests along the extremely clear rivers to sweeping alpine tundra across the drainage divides. The exposed limestone outcroppings along the peaks and ridges of the White Mountains form a striking scenic backdrop along most of this trail section.

Over most of the various routes, a wilderness environment exists. Opportunities for recreating and viewing plants and animals in a natural setting, largely undisturbed by man, are excellent.

Obstacles to recreation are significant over these routes. Except for the Chatanika-Beaver segment, the routes are presently accessible only by commercial and charter air service. Summer overland travel along most of the routes, except in a few short alpine areas, is extremely difficult, if not impossible. Thickets, windfalls, tussocks, lakes, muskegs, marshes, mosquitoes, and other obstacles continually impede travel. Winter offers far superior travel conditions although the severe cold, deep snow, remoteness, and long distances limit recreational use.

The use of the historic trails by modern day tracked vehicles and all-terrain vehicles has in some cases substantially changed the character of the immediate trail area. The enlarged trail width, the cutting, knocking down, or scraping of vegetation, "cat" tracks, and other signs of the mechanized age detract in places from the historical and primitive recreational values.

Similarly, the construction of the gravel pipeline road from the Yukon River to the North Slope has diminished wilderness and historic values. The road, if opened to the public, would improve access to some of the trail areas.

Recreational Uses

The only significant recreational use presently occurring on any of the route segments is between the Elliott Highway at approximately mile 22 and the Big Bend area of Beaver Creek. A trail follows the old route approximately 20 miles down Wickersham Creek to a BLM public use cabin on Beaver Creek. From the cabin area, the trail continues down Beaver Creek approximately 5 miles to the Big Bend area of Beaver Creek. This trail receives significant use by snowmachiners, cross-country skiers, and dog mushers, especially in the late winter and early spring months. Open water caused by springs in the Big Bend area provides winter grayling fishing.

A 22-mile summer trail generally paralleling the winter trail has been constructed by BLM on a nearby ridge above the Wickersham Creek valley. This trail receives some use by hikers during summer months, although the trail is, as yet, in only fair condition.

Some nontrail-oriented recreational use is probably also occurring. Fly-in fishing and hunting are widespread over the region and some light use probably takes place in the vicinity of the various routes.

With the exception of the trails into Beaver Creek from the Elliott Highway, recreational trail-oriented use is not anticipated to increase significantly over the next several years.

Nonrecreational Uses

Various segments of the historic routes are currently used as basic transportation arteries. The old Dall Creek route and the sled road from Coldfoot to Wiseman have been overlain or closely paralleled by a gravel highway. This road was used in construction of the trans-Alaska oil pipeline and may be opened to the public.

The trail segment from Allakaket to Bettles is heavily used in the winter months by snowmachiners. In addition to the travel from Allakaket to the store and other services in Bettles and to the visiting of friends and relatives, the trail provides access for subsistence hunting, trapping, and wood-cutting. A short segment of the trail south from Allakaket towards Tanana (Fort Gibbon) is also used in winter subsistence activities, primarily by snowmachines and to a lesser extent by dog teams.

Snowmachines and a few dog teams also utilize the historic route north from Tanana for hunting, trapping, and wood-cutting activities. A military radar installation is located several miles north of Tanana and may utilize portions of the historic route for local access and the functions of the site.

The villagers of Beaver also depend heavily on subsistence activities, and the segments of the Beaver-Caro wagon road and the Chatanika-Beaver trail are traveled for many miles north and south of the village in winter hunting, trapping, and wood-cutting activities. This use is primarily by snowmachine, although a few dog teams may still be used. Some summer use of the Beaver-Caro wagon road by ATV or on foot may be occurring north of Beaver, although brush, marshy ground, and stream crossings impede most travel for more than a few miles.

Mining continues on a small scale in the Wiseman and Chandalar Lake areas. Portions of the historic routes are occasionally traversed by cats and other heavy equipment and ATV's used in mining operations and in supplying field camps.

Future selections of public domain lands by Natives and the State could result in additional nonrecreational use of lands along the route. Resource development by the State and Native corporations is expected.

The proposed extensions of the transportation system by the State of Alaska as of July 1973 include two routes which involve segments of the historic routes. A road which would pass through Bettles and Allakaket is proposed from the existing pipeline road to Kobuk. This route would cross and, at other places pass near, the old route between Allakaket and Bettles. Another road would connect Arctic Village with the pipeline road. This road would follow the old Coldfoot-Caro route from the pipeline road to the Middle Fork of the Chandalar, then up that river and over a divide into the East Fork of the Chandalar drainage.

A preliminary, conceptual analysis of transportation and utility systems in Alaska, released by the Bureau of Land Management in October 1974, recommends a number of corridors be reserved for such systems. Several of these involve the historic routes. A corridor for a number of transportation and utility modes is proposed from the pipeline road through Bettles and Allakaket to Kotzebue and the Seward Peninsula. A railroad corridor is proposed which would generally follow the Fort Gibbon-Koyukuk Trail from Allakaket to Tanana. A corridor for an oil pipeline and gas pipeline is recommended from the pipeline road up the Yukon River, across the historic Beaver-Caro sled road in the Beaver area, and up the Porcupine River. An alternative route for a highway, gas pipeline, and oil pipeline is recommended which would follow the Middle Fork of the Chandalar from its headwaters then down the Chandalar past Caro to Fort Yukon.

Tramway Bar, where gold was first discovered in the Koyukuk area in 1893. (Bureau of Outdoor Recreation)

CONCLUSIONS AND RECOMMENDATIONS

Qualification for National Scenic Trail Designation

The criteria used in evaluating the Koyukuk-Chandalar routes were as follows:

Criterion: Because of their special characteristics, National Scenic Trails should be nationally significant and be capable of attracting visitors from throughout the United States.

Finding: The overland trails and routes to the Koyukuk and Chandalar gold districts were traveled very lightly, even during boom years. These districts, although the most important north of the Arctic Circle, were quite modest in terms of numbers of stampeders, miners, and amount of production in comparison to other gold districts in Alaska. These trails and routes could not be considered to have national historical significance, and, in all likelihood, would not attract visitors from throughout the United States because of their remoteness, general lack of major scenic and historical attraction, and arduous trail conditions, both winter and summer.

Criterion: National Scenic Trails are designated for hiking and other compatible uses. The National Trails System Act prohibits the use of motorized equipment on these trails, except in certain circumstances.

Finding: Historic travel along the route took the path of least resistance rather than a particularly scenic route. In addition, most of the route segments were used primarily in winter months when snow and ice covered obstacles, open water, and rough terrain. Most of the historic Koyukuk and Chandalar routes have low potential for summer hiking use. Winter nonmechanized recreational use such as cross-country skiing and dog mushing is presently only occurring over one 20-mile segment and potential for greater use appears low over remaining segments.

Snowmachines are presently used as basic transportation and in subsistence activities along segments of the historic routes near Tanana, Allakaket, Bettles (Evansville), and Beaver. Heavy equipment and ATV's have utilized portions of the route in connection with mining and mineral survey activities.

Criterion: National Scenic Trails of historical importance should adhere as accurately as possible to their principal historic routes.

Finding: The Dall Creek route and the historic sled road from Coldfoot to Nolan (Wiseman) have been overlain or closely paralleled by a gravel highway. Except in this area, the historic routes are generally undeveloped and a trail could be constructed which would adhere closely to the historic routes.

Criterion: National Scenic Trails should be provided with adequate public access through connecting local or regional trails. Access should be located at reasonable intervals to provide for trips of various lengths.

Finding: Surface transportation currently exists only to the Chatanika-Beaver Trail segment at mile 22 of the Elliott Highway. If and when the pipeline road is opened to the public, surface access would be available to the segment from Bettles to Wiseman and to the Coldfoot-Caro route at Coldfoot. Air access exists at scattered airfields and bush strips. A connecting trail system and access to points along the routes would be extremely costly, difficult, and impractical to construct.

Criterion: National Scenic Trails should be primarily land based.

Finding: The routes to the Koyukuk and Chandalar districts were primarily land based.

Criterion: National Scenic Trails should be of sufficient length to encompass and provide appropriate access to the resources which are a basis for the trails designation.

Finding: The historic trail from Fort Gibbon to Coldfoot and Nolan (Wiseman) was 273 miles long. The route from Chatanika through Beaver to Caro was 195 miles in length. The segment from Caro to Coldfoot was 85 miles long. Other segments totaled hundreds of additional miles for an overall total of 1,273 miles.

Criterion: National Scenic Trails should be continuous except where no practicable or feasible interconnection exists.

Finding: A continuous trail following the historic route(s) could be constructed.

Conclusions

The various trails and routes leading to and through the Koyukuk and Chandalar gold strikes lack major historical, scenic, or recreational importance. They are not capable of attracting visitors from throughout the United States, and do not have good potential for hiking or other recreational uses. For this reason, designation as National Scenic or National Historic Trails is not warranted.

Recommendations

It is recommended that no further consideration be given to the Koyukuk-Chandalar routes as potential National Scenic or National Historic

Trails. As the various Federal and State agencies develop recreational plans for those areas adjacent to the new pipeline road, consideration should be given to developing trails from the road along short segments of the historic routes in those areas of high scenic values such as the Coldfoot and Wiseman areas.

Several historic townsites exist along the routes, which contain buildings and other remnants dating back to the Gold Rush Era. Because of the likelihood for loss of these historic remains, it is recommended that the land managing agencies work with private landowners in developing a plan for historic preservation and possible inclusion on the National Register of Historic Places for the townsites of Wiseman (Nolan), old Bettles, and Caro.

Historic sites along the Yukon and Koyukuk Rivers need to be surveyed for evidence of historic resources. Potential historic significance exists at Fort Gibbon and Fort Hamlin on the Yukon River; Bergman, Arctic City, and Peavey on the Koyukuk River; and several camps along the South Fork Koyukuk River.

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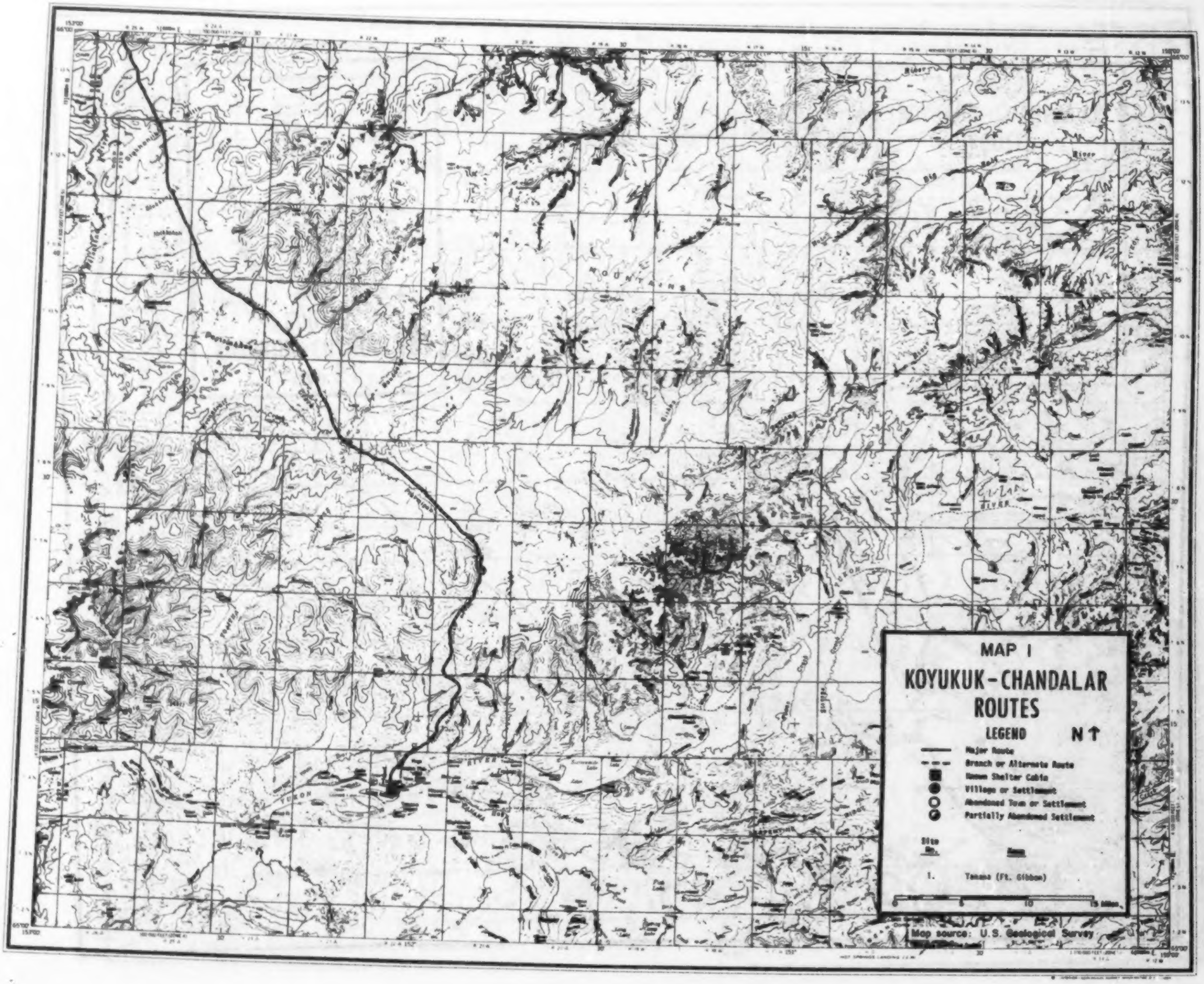
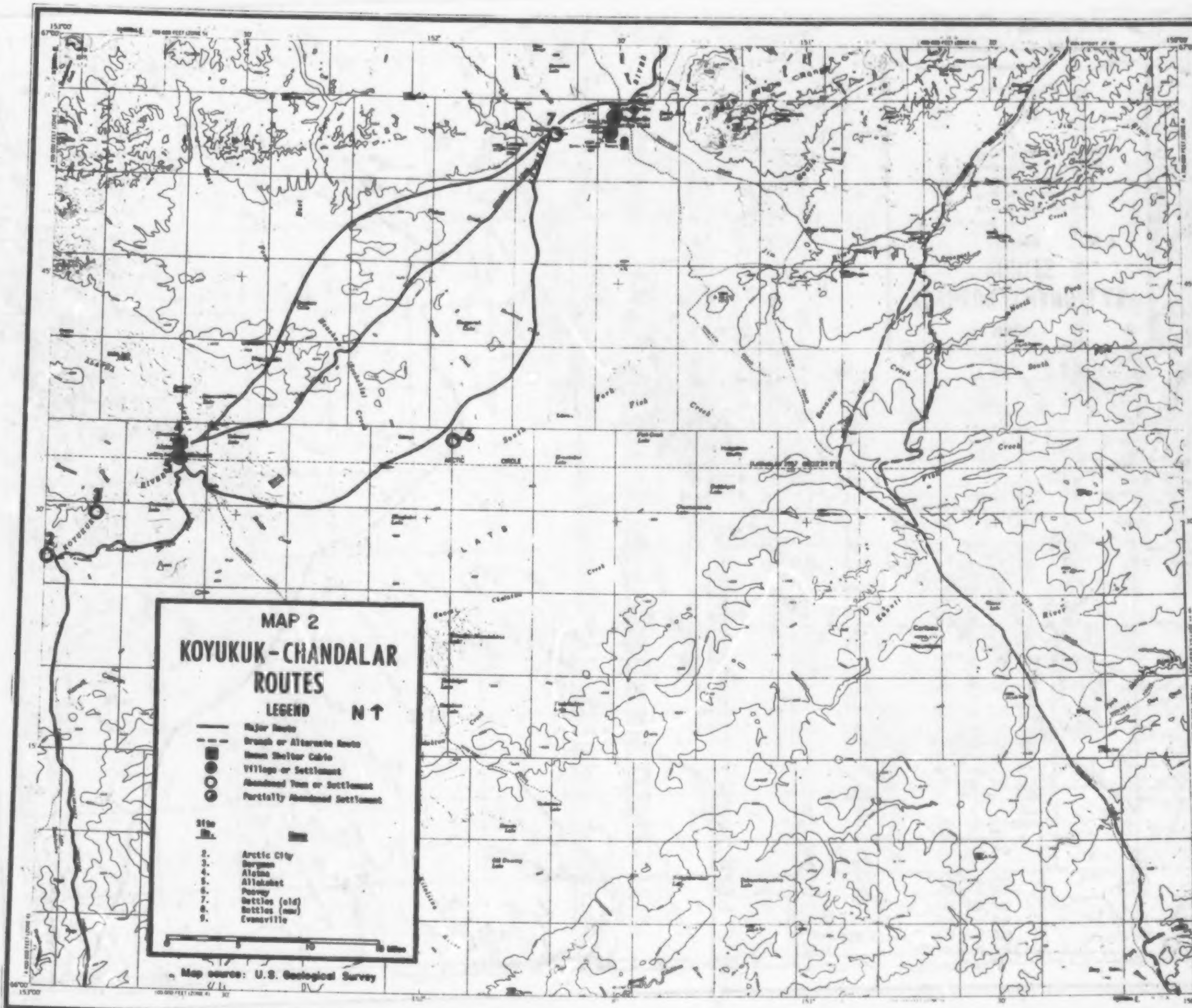

MAP 1
KOYUKUK-CHANDALAR ROUTES
LEGEND
N ↑
Major Route
Branch or Alternate Route
Known Shelter Cabin
Village or Settlement
Abandoned Town or Settlement
Partially Abandoned Settlement
Site No.
Name
1.
Tanana (Ft. Gibbon)
0
5
10
15 Miles
MOUNTAINS
YUKON
RIVER
Big
River
30
151°
152°
65°00'
66°00'
153°00'
150°00'

Map source: U.S. Geological Survey

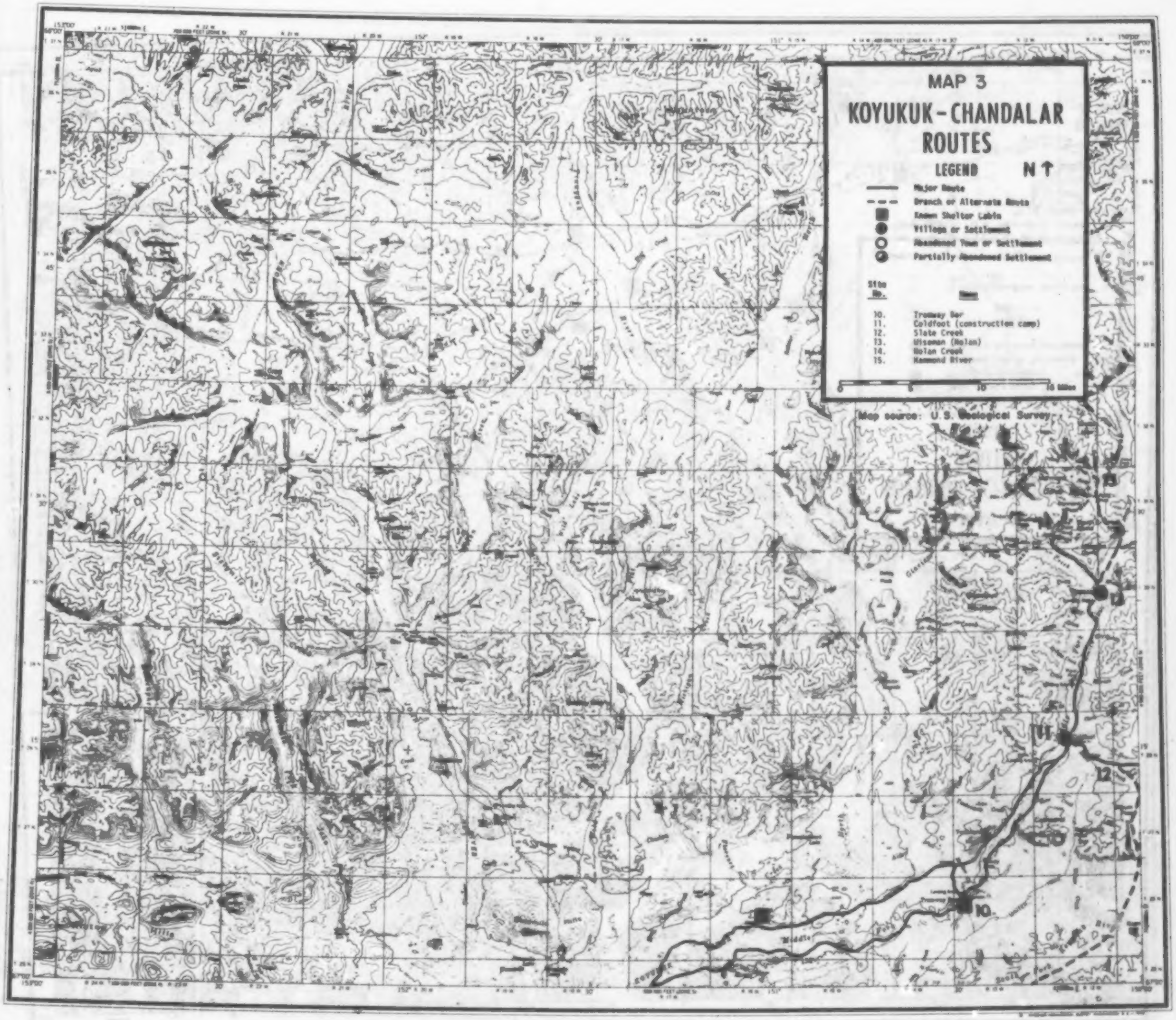


LEGEND
N ↑
Major Route
Branch or Alternate Route
Known Shelter Cabin
Village or Settlement
Abandoned Town or Settlement
Partially Abandoned Settlement
Site No.
Name
2. Arctic City
3. Bergman
4. Alatna
5. Allakaket
6. Peavey
7. Bettles (old)
8. Bettles (new)
9. Evansville
0
5
10
15 Miles
Koyukuk
River
Creek
Fish
South Fork
North Fork
Arctic Circle
Chandalar
151°
152°
153°00'
150°00'
67°00'
66°00'

MAP 2

KOYUKUK-CHANDALAR ROUTES

Map source: U.S. Geological Survey

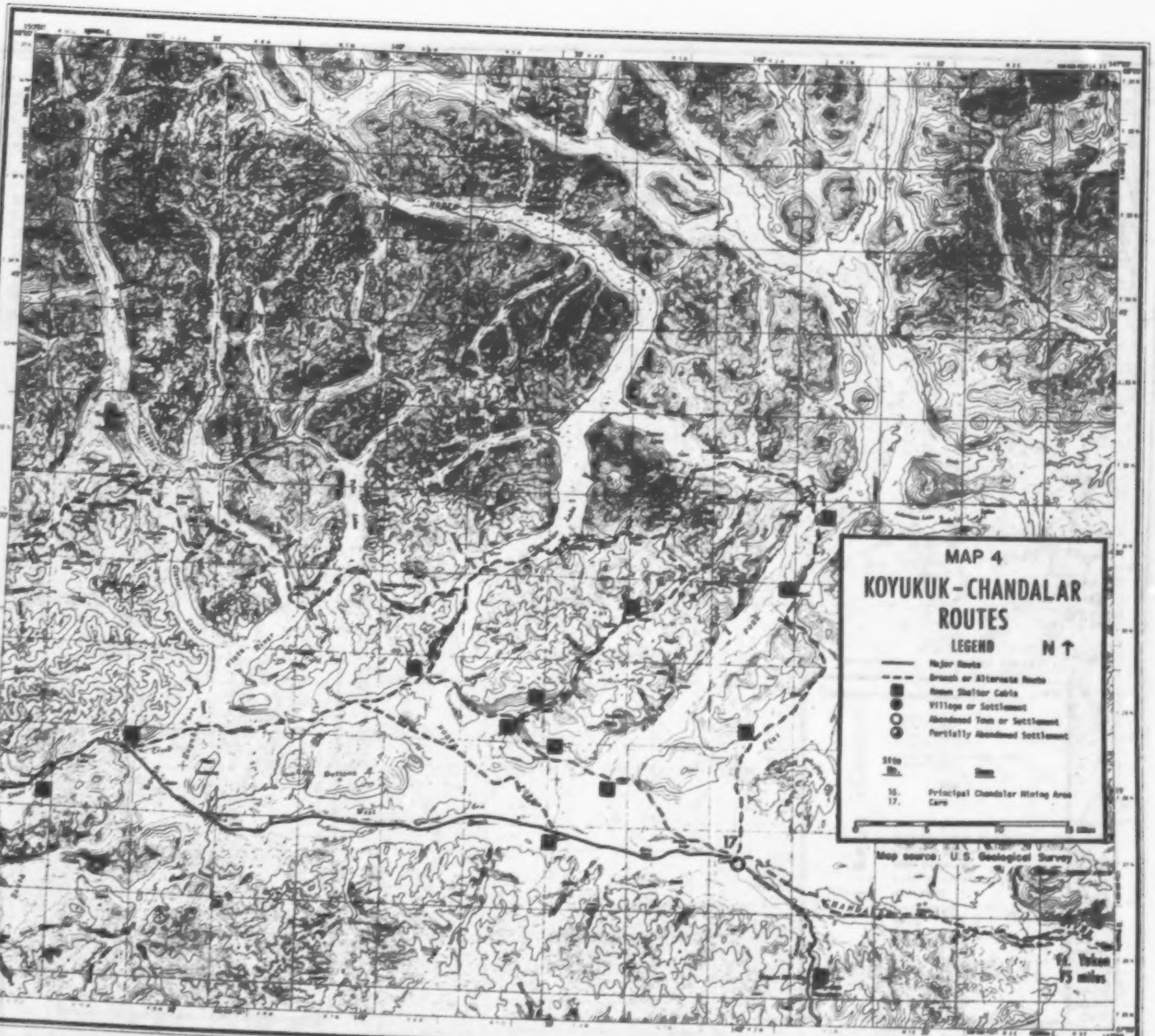


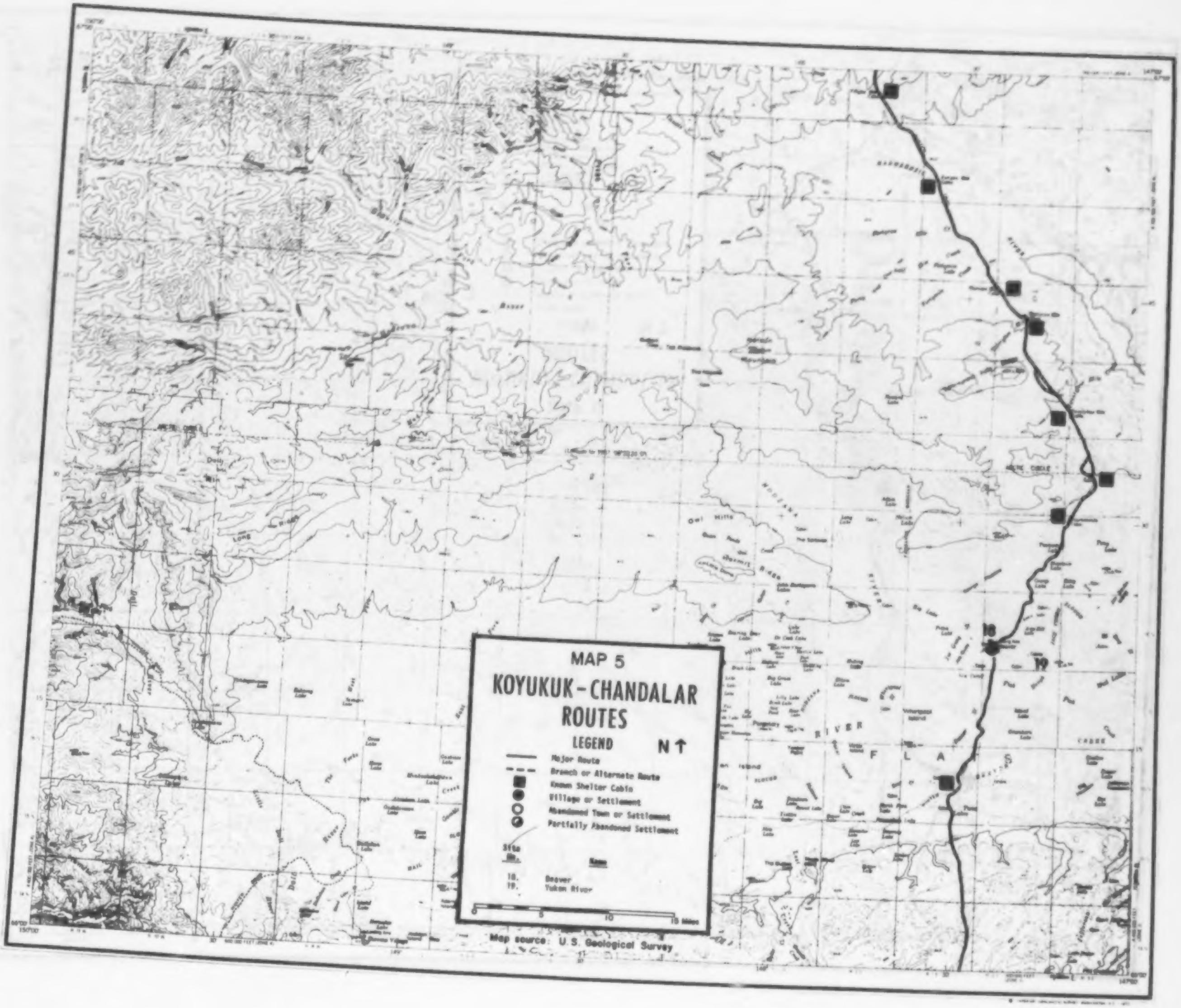
MAP 3

KOYUKUK-CHANDALAR ROUTES

LEGEND
N ↑
Major Route
Branch or Alternate Route
Known Shelter Cabin
Village or Settlement
Abandoned Town or Settlement
Partially Abandoned Settlement
Site No.
Name
10. Tramway Bar
11. Coldfoot (construction camp)
12. Slate Creek
13. Wiseman (Nolan)
14. Nolan Creek
15. Hammond River
0
5
10
15 Miles
10.
11
12

Map source: U.S. Geological Survey


MAP 4
KOYUKUK-CHANDALAR ROUTES
LEGEND
N ↑
Major Route
Branch or Alternate Route
Known Shelter Cabin
Village or Settlement
Abandoned Town or Settlement
Partially Abandoned Settlement
Site No.
Name
16. Principal Chandalar Mining Area
17. Caro
0
5
10
15 Miles
Map source: U.S. Geological Survey
Ft. Yukon 75 miles
17

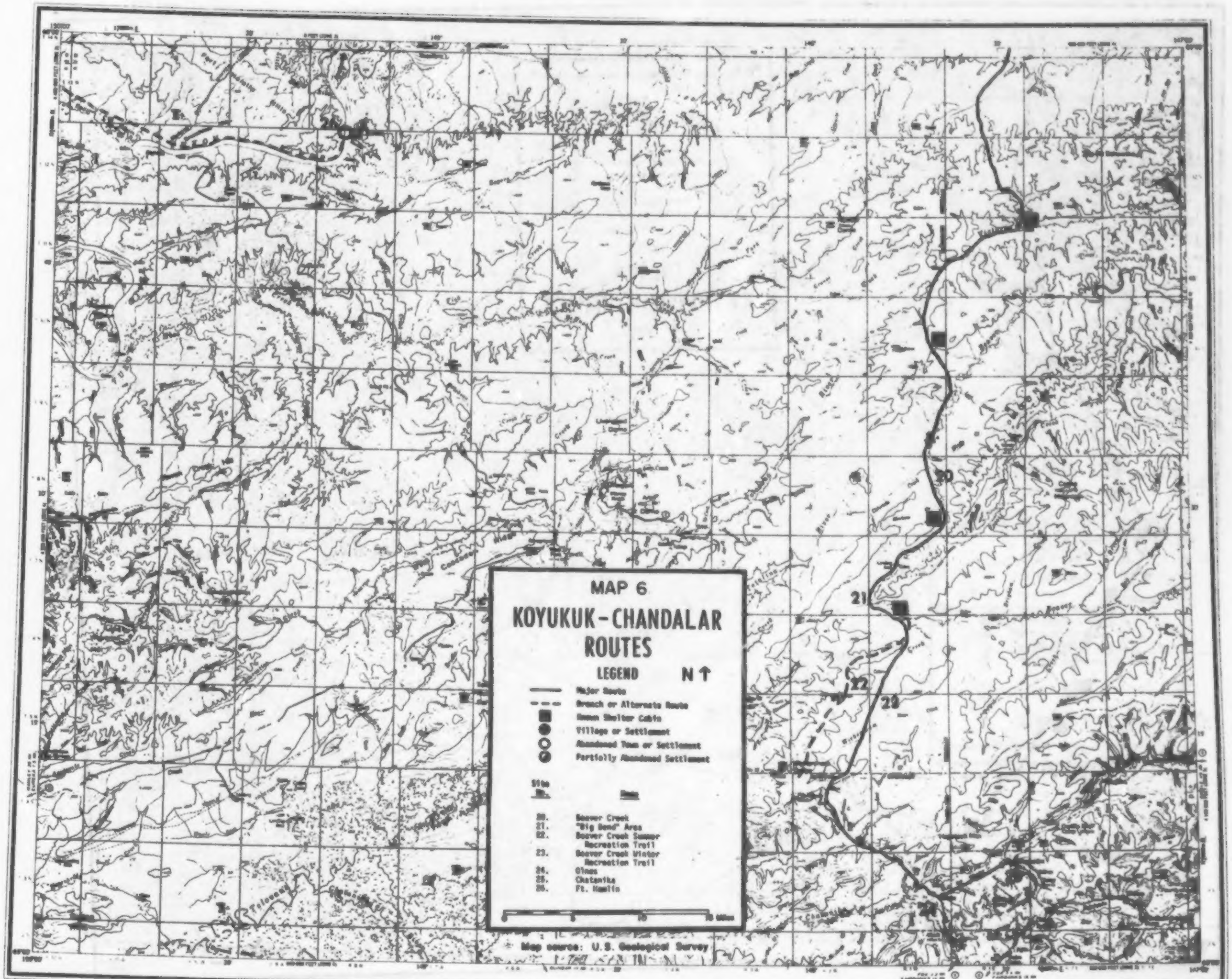


MAP 5

KOYUKUK-CHANDALAR ROUTES

LEGEND
N ↑
Major Route
Branch or Alternate Route
Known Shelter Cabin
Village or Settlement
Abandoned Town or Settlement
Partially Abandoned Settlement
Site No.
Name
18. Beaver
19. Yukon River
0
5
10
15 Miles
RIVER
F L A T S
18
19

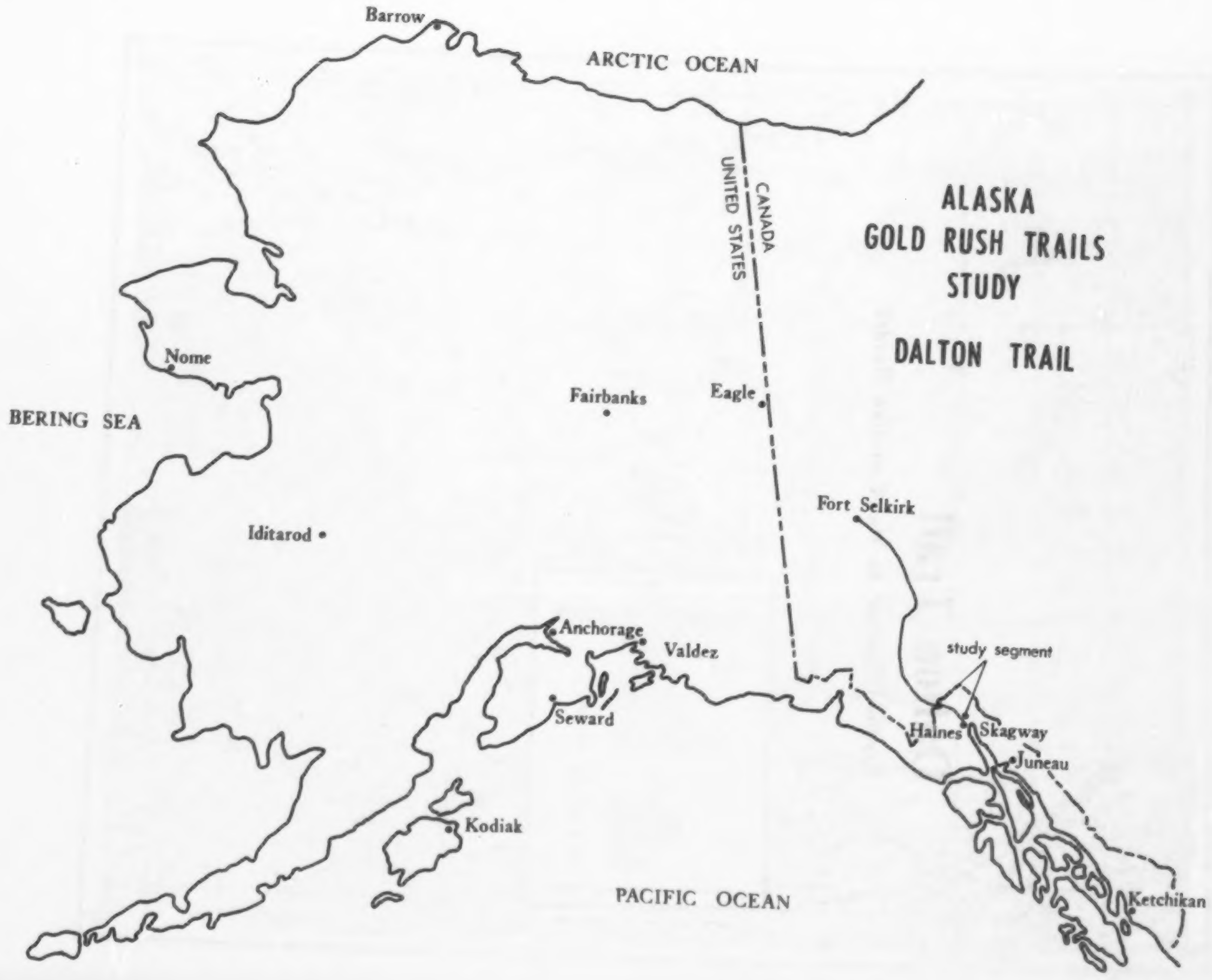
Map source: U.S. Geological Survey


MAP 6
KOYUKUK-CHANDALAR ROUTES
LEGEND
N ↑
Major Route
Branch or Alternate Route
Shelter Cabin
Village or Settlement
Abandoned Town or Settlement
Partially Abandoned Settlement
Site No.
Name
20. Beaver Creek
21. "Big Bend" Area
22. Beaver Creek Summer Recreation Trail
23. Beaver Creek Winter Recreation Trail
24. Olnes
25. Chatanika
26. Ft. Hamlin
0
5
10
15 Miles
20
21
22
23
24

Map source: U.S. Geological Survey

Dalton Trail

Pyramid Harbor to the Canadian Border



ALASKA
GOLD RUSH TRAILS
STUDY

DALTON TRAIL

Barrow
ARCTIC OCEAN
CANADA
UNITED STATES
Nome
BERING SEA
Fairbanks
Eagle
Fort Selkirk
Iditarod
Anchorage
Valdez
Seward
study segment
Haines
Skagway
Juneau
Kodiak
PACIFIC OCEAN
Ketchikan

DALTON TRAIL (Pyramid Harbor to the Canadian Border)

BACKGROUND

For hundreds of years, the Chilkat Indians along the Chilkat River in southeast Alaska used a route through the rugged Coastal Mountains to trade with the so-called Stick Indians in the interior. The Chilkat people guarded this route jealously to prevent others from interfering with their trade monopoly with the Sticks.

In the late 1800's, increasing numbers of prospectors, explorers, missionaries, and others moved up the coast from Seattle, British Columbia, and other areas, and the secret trail of the Chilkats was soon discovered. In 1889, Edmund Bean is reported to have learned of the route up the Chilkat and Klehini Rivers into the interior. The year before, John Muir and a missionary named S. Hall Young had sailed into Chilkat Inlet and talked with Chilkat Indian leaders from the village of Klukwan. In 1881, Young returned with Sheldon Jackson and together they established Chilkat Mission, soon renamed Haines Mission, near the mouth of the Chilkat River.

Frank Leslie of Leslie Magazine organized a party in 1890 which explored the area up the Chilkat River and over the divide into the interior. One of the young scouts hired for this expedition was John "Jack" Dalton. The following year, Dalton and E. J. Glave explored the route, which became the Dalton Trail, to the Indian village on the Tatshenshini River, a tributary of the Alsek. Pack horses were taken into the interior on this trip for the first time.

Gold was discovered in the Klondike in the fall of 1896. Word reached outside in the late spring of 1897 and the gold rush was on. Jack Dalton, by this time, was a seasoned businessman in the upper Lynn Canal area and immediately set in motion plans to develop a toll trail to the gold fields. Although the routes over Chilkoot Pass and White Pass were shorter, they were also much steeper and more tortuous than the old Chilkat Trail. In July of 1897, Dalton hired a professional surveyor to map and survey his new personal trail to the Klondike following the historic Chilkat route.

By the early summer of 1897, a good pack horse trail had been constructed from Pyramid Harbor near the mouth of the Chilkat River to the summit of the Coastal Mountains in Canada. From there, the trail continued through more or less open country to Rink Rapid on the Yukon.

During that same summer, gold was discovered near the Dalton Trail on Porcupine Creek, 36 miles from Haines Mission. A small rush occurred over the next year. Gold mining in the Porcupine area continued for many years and played an important role in the local economy into the early 1900's.

The Alaskan and Yukon gold rushes created a need for law enforcement. Many posts were established in the early 1900's, the largest being Fort William H. Seward. This fort was established by the Army in 1903-04 and was located just outside of Haines Mission.

LOCATION AND REGIONAL ENVIRONMENT

General Alignment

The overall general alignment of the Dalton Trail in Alaska and British Columbia is shown on the following maps. It connected the northern portion of southeastern Alaska with the Yukon.

From its origin at Pryamid Harbor, it crossed about 5 miles of mud beach exposed at low tide, then proceeded along the west side of the Chilkat River, moved away from the river opposite Klukwan, then up the south side of the Klehini River to the vicinity of Boulder Creek. Here the trail crossed the Klehini and continued along the north side to the Canadian border.

From the border, the trail zigzagged to the first summit, a little over 3,300 feet, and down the Tatshenshini River to Dalton Post. From there, the trail went around Dezadeash Lake to Champagne, and then to Hutshi. From Hutshi, the main trail went down the Nordenskiold River to Carmacks and Rink Rapid on the Yukon. An extension of this route continued north to Fort Selkirk. A branch trail went west out of Hutshi to Aishihik Lake and then north across the upper Nisling River drainage to Fort Selkirk at the Pelly River and Yukon confluence.

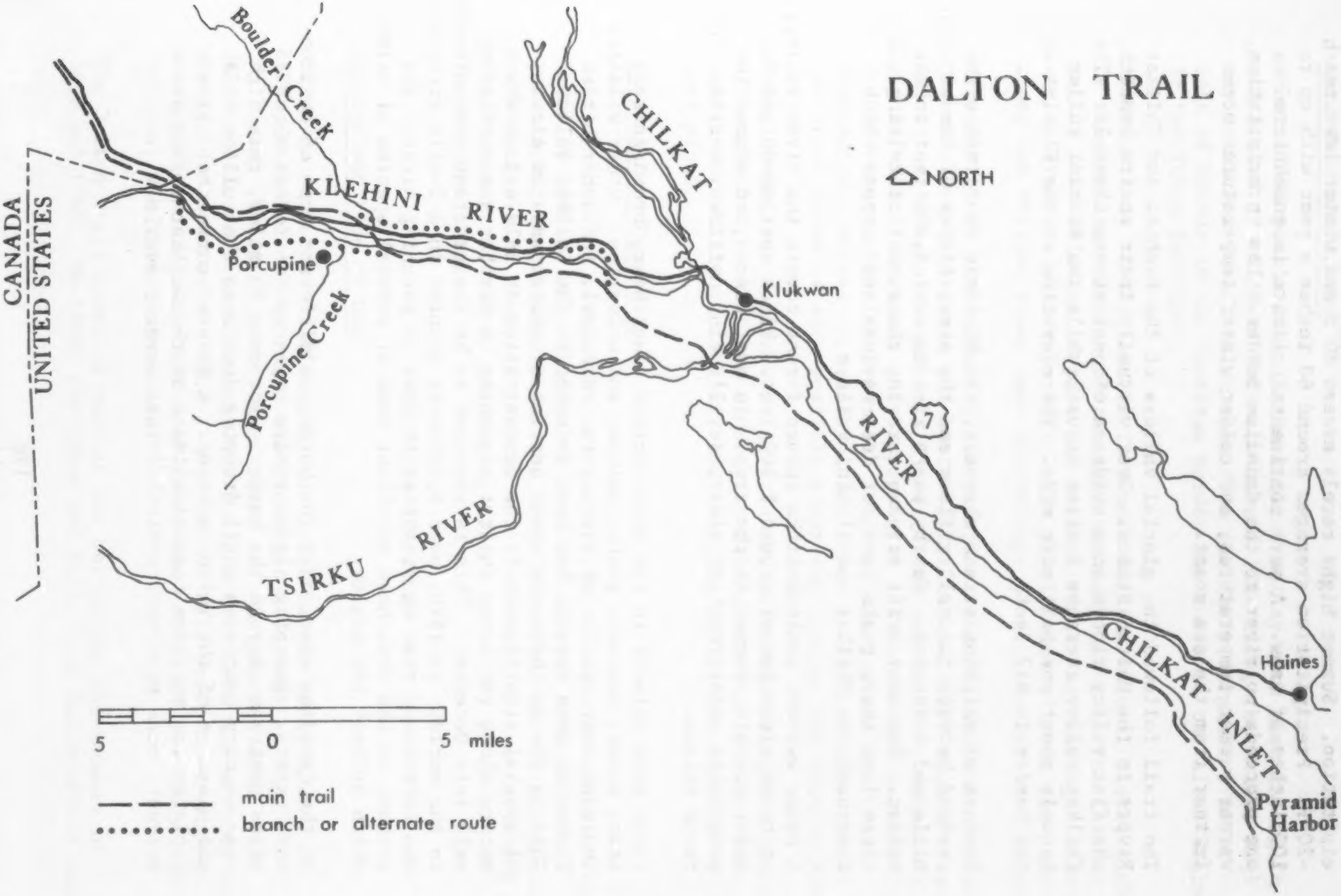
Because the Klehini River is a braided, glacier-fed river, channel changes were frequent and water depths varied greatly over the course of a season. Consequently, river crossing points varied, sometimes ranging from just above Klukwan to near the Canadian border.

Length

The segment in the United States was about 55 miles long. From Pyramid Harbor to Dalton Post in the Yukon was 126 miles. The length of the Dalton Trail from Pyramid Harbor to Rink Rapid on the Yukon was about 305 miles. The trail continued an additional 45 miles to Fort Selkirk. Dawson is located approximately 200 river miles downstream from Fort Selkirk. The major constructed portion of the trail extended approximately 65 miles to timberline.

Regional Climate, Topography, Vegetation, and Wildlife

The Dalton Trail area in the United States lies in a maritime climatic zone characterized by cool summers, moderate winters, and heavy pre-



DALTON TRAIL

NORTH
CHILKAT
Boulder Creek
KLEHINI RIVER
CANADA
UNITED STATES
Porcupine
Porcupine Creek
Klukwan
7
RIVER
TSIRKU RIVER
CHILKAT INLET
Haines
Pyramid Harbor
5
0
5 miles
main trail
branch or alternate route

cipitation. Summer highs rarely exceed 80°F and winter lows reach -20°F. Precipitation averages around 60 inches a year with up to 100 inches of snow. A more continental climate is encountered as one proceeds up river to the Canadian border. Less precipitation, warmer summer temperatures, and colder winter temperatures occur further from the sea coast.

The trail followed the glacial valleys of the Klehini and Chilkat Rivers in the United States. Over virtually their entire breadth, the flat valley floors show evidence of past stream channels. The Chilkat valley averages 2 miles across, while the Klehini valley is only about one-half mile wide. The elevation of the Klehini at the border is 812 feet.

Because of shifting stream channels, the historic route was often pressed between the valley floor and the steep slopes of the adjacent hills and mountains. Nearby peaks rise to over 5,000 feet in elevation. The many swift streams carrying the runoff of melting glaciers from these peaks have cut deep ravines and canyons which intersect the Chilkat and Klehini valleys.

A dense western hemlock-Sitka spruce forest covers the river valleys up to an elevation of around 2,500 feet. Black cottonwood and red cedar are also common in the area. In most places, an almost inpenetrable undergrowth of alder, devil's club, willows, berries, and ferns exists.

Large game animals in the area include black bear, brown/grizzly bear, moose, mountain goats, wolves, and wolverine. Other wildlife includes many species of furbearers, waterfowl, and other birds. Trumpeter swan nesting has been recorded in the Chilkat valley. This is the southernmost known nesting of these swans in Alaska. Of special significance is the concentration of bald eagles which occurs along the lower Chilkat beginning in October and persisting well into December. This is reported to be the greatest concentration in the world. In 1970, over 3,500 were counted in a 2-mile stretch--one cottonwood tree was reported to have 56 perching birds. The streams in the area have excellent runs of several species of salmon which attract the eagles.

On the Canadian side, near the border, a different type of environment exists. Sweeping alpine tundra replaces the forest about 15 miles upstream, beyond the border. For over 50 miles, this high open country continues until dropping down into the rolling hills and plateaus of the Yukon interior. A severe continental climate replaces the maritime coastal climate of the Chilkat valley and a sparser, more open spruce-birch forest cover prevails.

Land Uses and Access

About 1,500 people live in the Chilkat valley with most living in and around the City of Haines. Others live along the Haines Highway or Haines Cutoff which runs from the ferry terminal 3 miles east of Haines to the Canadian border and north to the Alcan Highway in the Yukon Territory.

Although most of the land is in a more or less natural state, timber is the leading industry of the area and many areas in the Chilkat valley show evidence of past and present timber harvesting. Fishing and tourism are also important. The development of iron ore deposits along the Chilkat River near the village of Klukwan has been proposed.

In addition to the highway which parallels the Chilkat and Klehini Rivers along their east and north banks respectively, access by air and water is also available. Haines is served daily by commercial air service from Juneau and by passenger and auto ferry service from Prince Rupert, British Columbia; Skagway, Alaska; and Seattle, Washington. Access by motorboat and canoe to various sections of the trail route is also possible along the Chilkat and Klehini Rivers.

Over 100 Indians continue to live in the historic village of Klukwan. Although tied to a dollar economy by Haines and the highway, some subsistence hunting, fishing, and trapping activities continue to take place.

General Land Ownership

Most of the land in the Chilkat and Klehini valleys is owned by the State of Alaska. The village of Klukwan recently selected lands surrounding the village under the terms of Public Law 94-204 passed January 2, 1976. Several parcels of private property exist along the Dalton Trail route, and mining claims may still be active in the Porcupine area.

HISTORIC RESOURCES

Period and Type of Use

Prior to construction of the Dalton Trail in the early summer of 1898, travel over the route was directly up the valley floor following the river banks, sand bars, and old channel cut. This route could only be followed when the glaciers were not melting and water levels were low. Thus, only in the fall prior to freeze-up and in the spring when the deep snows had melted in the lower elevations, was this route used.

The Dalton Trail received most of its use during the summers of 1898 and 1899. By 1900, the Yukon and White Pass Railroad had been completed between Skagway and Whitehorse, eliminating most of the hardships of that route. What advantage the Dalton Trail had over the rugged Chilkoot and White Pass routes was quickly lost when passenger and freight rail service became available.

Although the Dalton Trail traversed an easier pass from the Lynn Canal to the interior gold fields, it never attracted the numbers of stampeders that went over the nearby Chilkoot and White Pass Trails. While easier, the Dalton Trail was considerably longer than the other two--300 miles as opposed to 40 or 50 miles.

The largest traffic over the trail consisted of livestock. The Dalton Trail was well suited for horses, cattle, and sheep and played an important role in supplying booming Dawson with meat and pack animals. Over 2,000 head of cattle and 2,000 horses passed over the trail in the summer of 1898. Dalton charged $2 a head for cattle and $2.50 a horse for use of his trail. Animals were taken as far as Rink Rapid and sometimes Fort Selkirk where they were transferred to scows and floated down the Yukon to Dawson.

The trail also played a part in the famous U. S. Reindeer Relief Expedition. The food crisis in Dawson in the winter of 1897-98 prompted Congress to appropriate $200,000 for the purchase of a reindeer herd to ship north to the Yukon. Over 500 reindeer were shipped from Norway, brought across the United States to Seattle by rail, then shipped to Haines. With no feed for them at Haines, most starved to death before reaching the lichens in the alpine areas. They were driven over the Dalton Trail and northward to Dawson and encountered so many obstacles and tortures that only 114 animals reached their destination nearly a year later in January 1899. Needless to say, the food crisis had long since passed and it was the relief expedition which ended up having to be aided.

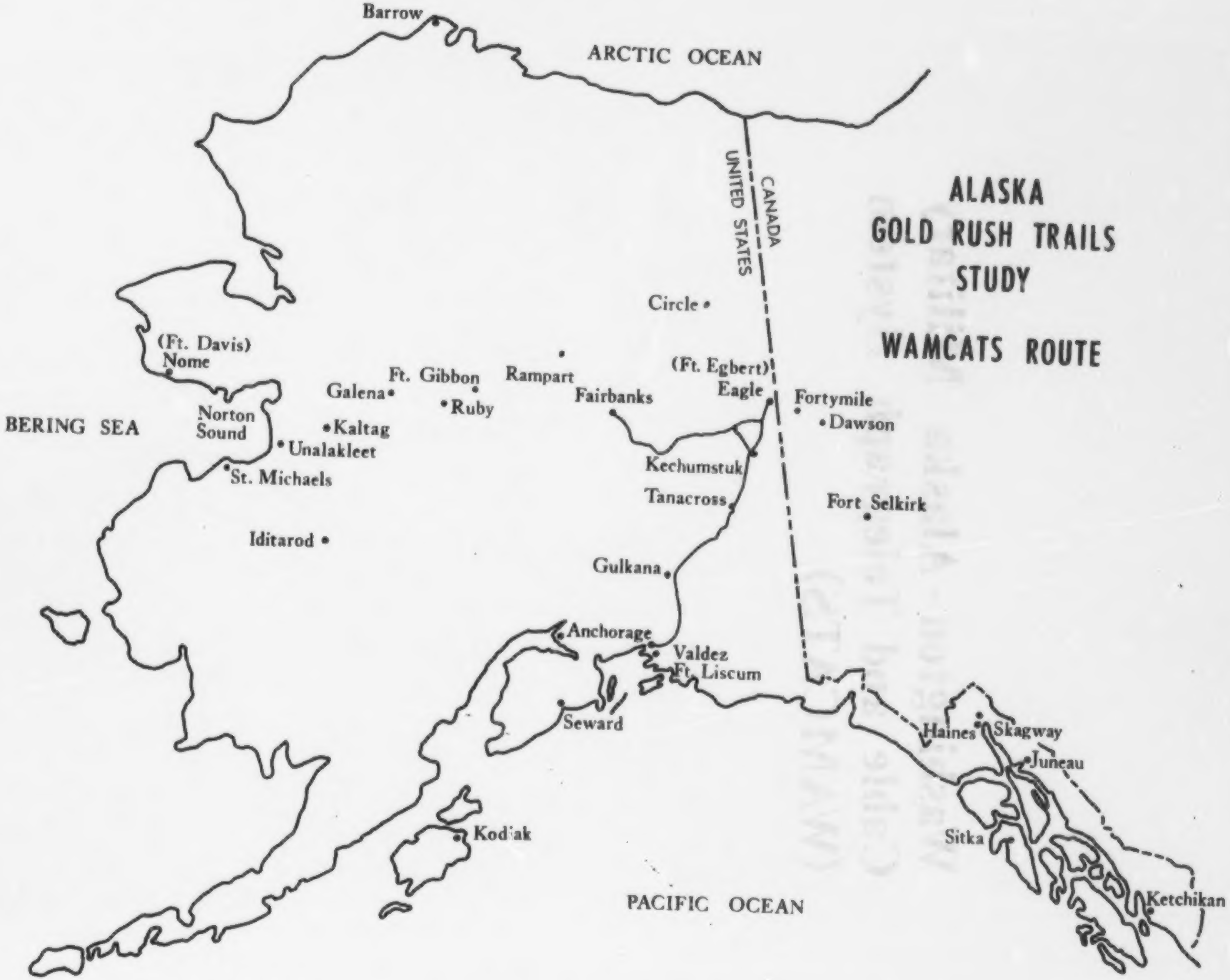
Jack Dalton also started the Dalton Pony Express Company during the summer of 1898. With 250 saddle horses, he attempted to establish passenger service between the port at Haines and river steamers operating between Dawson and Rink Rapid. For $150 (Burton reports $250), travelers could bridge the gap in water transportation and avoid the perilous Chilkoot and White Pass routes. However, the company soon went under when steamers began operating on the lakes in the upper Yukon between Whitehorse and the Chilkoot and White Pass, facilitating travel over those routes. Similarly, mail was carried by Dalton's Pony Express only once before being directed to the lake steamer route.

The gold strike on Porcupine Creek in the summer of 1898 brought 1,000 people into the local area during the next year--many coming over the Dalton Trail. In the early 1900's, however, the establishment of Fort William H. Seward outside Haines shifted the attention

The Chilkat River paralleling the Dalton Trail, 10 miles north of Haines. (Bureau of Outdoor Recreation)

ALASKA
GOLD RUSH TRAILS STUDY

WAMCATS ROUTE


Barrow
ARCTIC OCEAN
CANADA
UNITED STATES
Circle
(Ft. Davis)
Nome
Ft. Gibbon
Rampart
(Ft. Egbert)
Eagle
Fortymile
Galena
Ruby
Fairbanks
Dawson
Norton Sound
BERING SEA
Kaltag
Unalakleet
Kechumstuk
St. Michaels
Tanacross
Fort Selkirk
Iditarod
Gulkana
Anchorage
Valdez
Ft. Liscum
Seward
Haines
Skagway
Juneau
Kodiak
Sitka
Ketchikan
PACIFIC OCEAN

WASHINGTON-ALASKA MILITARY CABLE AND TELEGRAPH SYSTEM (WAMCATS)

BACKGROUND

With the influx of thousands of miners to Alaskan and Canadian gold fields, the need for a reliable, speedy means of communication with the outside became paramount in the late 1890's. To send a message from the interior of Alaska to Washington, D. C., and receive a reply generally required a year's time. Accordingly, on May 26, 1900, the Congress authorized the War Department, which administered Alaska, to begin construction of a system of telegraph lines and submarine cables which would interconnect all of Alaska's military posts and tie in directly with the rest of the United States and Washington, D. C.

The telegraph portion of the network was completed in 1903. Initially, the network tied in with a line extending south through Canada by way of Dawson and Vancouver. However, in 1904, a submarine cable connecting Seattle and Ft. Liscum was completed, thus eliminating the necessity for transmitting all messages from Alaska through Canada.

By 1906, some 2,347 miles of submarine cable, 1,375 miles of land line, and a 107-mile wireless link across Norton Sound comprised the WAMCATS network. The estimated costs were $1,144,907 for the submarine cable, $848,375 for land lines, and $32,700 for the wireless line.

LOCATION AND REGIONAL ENVIRONMENT

General Alignment

The telegraph line portion of WAMCATS comprised a total of 1,497 land miles. The two major segments extended between Kechumstuk, Fort Gibbon (Tanana), and St. Michaels in an east-west direction, and between Fort Egbert (Eagle) and Fort Liscum (Valdez) in a north-south direction. For this study, most of the mileage of these segments was inspected from the air. Portions were also examined on the ground. The line between the mouth of the Fortymile River in Canada and Eagle, and in the Fortymile drainage south from Eagle, was examined first-hand during field work for the Fortymile Wild and Scenic River study. The Bureau of Land Management has also evaluated much of the line between Eagle and Valdez.

Length

Three segments (376 miles) of the land-based line were determined to have the best potential for recreational use and historic interpretation due to terrain conditions, accessibility, and the existence of historical remnants. See the map on page 87. They are:

pages tightly bound

best copy available

Fort Egbert to Slana	220 miles
Kechumstuk to the Richardson Highway in the vicinity of Quartz Lake	145 miles
Fort Egbert to Dawson	11 miles in Alaska, plus approximately 100 miles in Canada

A fourth section comprising approximately 20 miles south of Tonsina through Kimball Pass is discussed under the Valdez-Fairbanks Trail. A fifth section comprising some 95 miles between Unalakleet and Kaltag is discussed under the Iditarod Trail.

Regional Climate, Topography, Vegetation, and Wildlife

The climate associated with the Eagle area is characterized by severe winters and mild summers with long hours of daylight. During the winter, extended periods with temperatures at or below -35°F are common. Periods where the temperature drops to -50°F are not unusual. Generally the winters are noted for the lack of wind, hence the wind chill factor is not as serious as in other parts of Alaska. Summers are warm with temperatures reaching 70°F and occasionally 90°F. Freezing temperatures may occur during any month. Thunderstorms are common and normally localized.

Topography is varied, ranging from the gently rolling hills of the Yukon-Tanana Upland immediately south of Eagle, to narrow river and stream valleys, to the extensive flood plain of the Tanana River. A major muskeg area is found in the Mosquito Flats area along the Fortymile River. Elevation ranges from less than 1,000 feet at Eagle, to 4,000 feet in the Fortymile drainage, to 1,500 feet in the Tanana Valley, to almost 4,000 feet in Indian Pass just north of Slana.

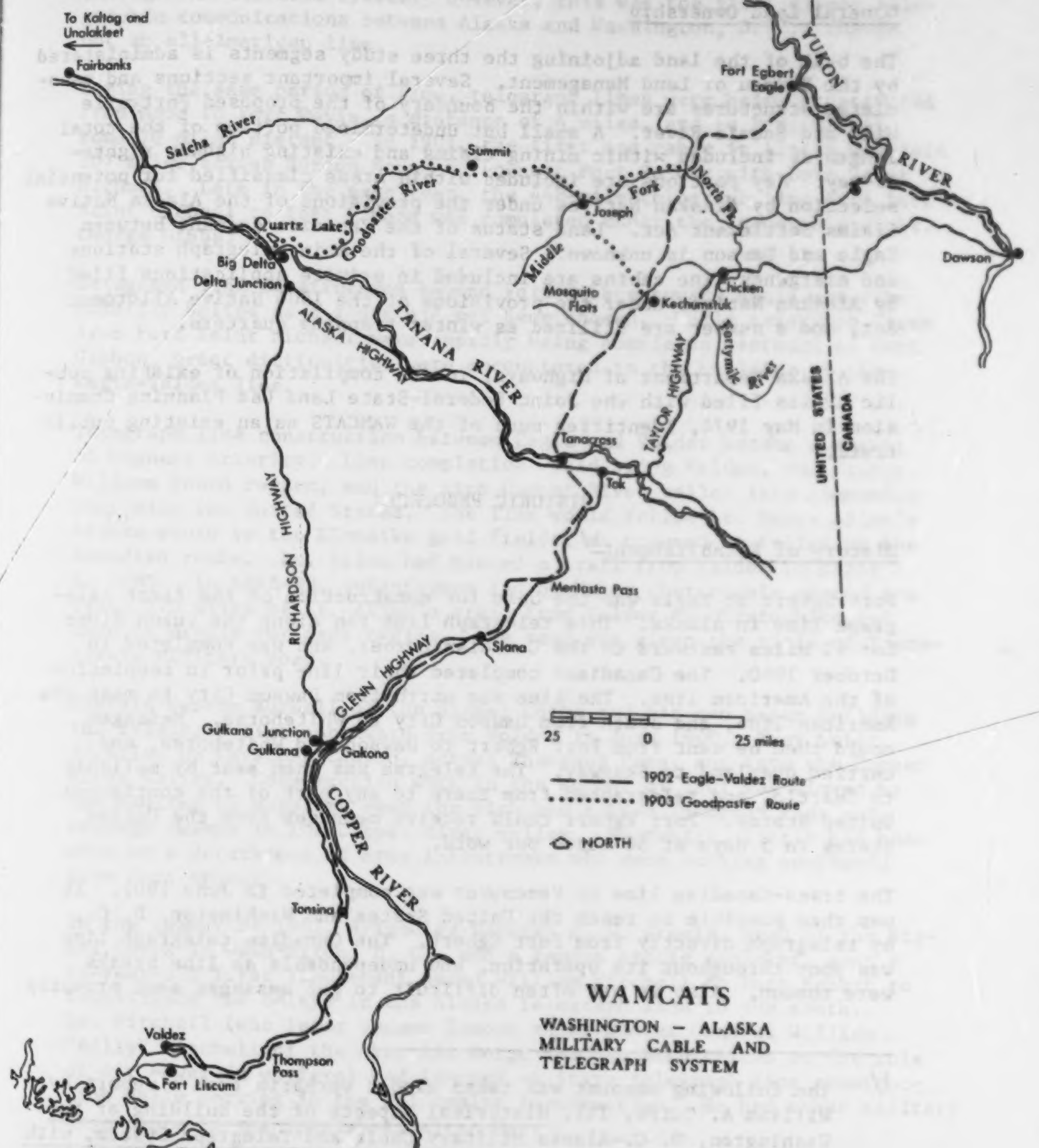
Vegetation is variable, ranging from alpine tundra to mixed spruce-birch forests along the water courses.

A wide range of wildlife species-including moose, wolf, caribou, grizzly and black bear, the lesser mammals, and birds--occur in relative abundance.

Land Uses and Access

Overall land use in the area is associated with mining, hunting, fishing, and trapping. Major communities are Eagle, Big Delta, Tanacross, and Mentasta Lake.

Public access to segments of the line is possible from the Glenn, Richardson, and Taylor Highways. The line north of the Alaska Highway is not readily accessible.


To Kaltag and Unalakleet
Fairbanks
Salcha River
Summit
Goodpaster River
Joseph
Middle Fork
North Fk
Fort Egbert
Eagle
YUKON RIVER
Dawson
Quartz Lake
Big Delta
Delta Junction
Mosquito Flats
Kechumstuk
Chicken
Fortymile River
TANANA RIVER
ALASKA HIGHWAY
TAYLOR HIGHWAY
UNITED STATES
CANADA
Tanacross
Tok
RICHARDSON HIGHWAY
Mentasta Pass
Slana
GLENN HIGHWAY
Gulkana Junction
Gulkana
Gakona
COPPER RIVER
Tonsina
Valdez
Fort Liscum
Thompson Pass
25 0 25 miles
1902 Eagle-Valdez Route
1903 Goodpaster Route
NORTH

WAMCATS

WASHINGTON – ALASKA MILITARY CABLE AND TELEGRAPH SYSTEM

General Land Ownership

The bulk of the land adjoining the three study segments is administered by the Bureau of Land Management. Several important sections and associated structures are within the boundary of the proposed Fortymile Wild and Scenic River. A small but undetermined portion of the total length is included within mining claims and existing highway rights-of-way. Key portions are included within areas classified for potential selection by Alaskan Natives under the provisions of the Alaska Native Claims Settlement Act. Land status of the Canadian segment between Eagle and Dawson is unknown. Several of the main telegraph stations and emergency line cabins are included in private applications filed by Alaskan Natives under the provisions of the 1906 Native Allotment Act, and a number are utilized as winter trapping quarters.

The Alaska Department of Highways, in its compilation of existing public trails filed with the Joint Federal-State Land Use Planning Commission in May 1974, identifies much of the WAMCATS as an existing public trail.

HISTORIC RESOURCES

History of Establishment[1]

Fort Egbert at Eagle was the base for construction of the first telegraph line in Alaska. This telegraph line ran along the Yukon River for 12 miles eastward to the Canadian Border, and was completed in October 1900. The Canadians completed their line prior to completion of the American line. The line ran north from Dawson City to meet the American line, and south from Dawson City to Whitehorse. Messages could then be sent from Fort Egbert to Dawson and Whitehorse, and carried overland to Skagway. The telegram was then sent by mailship to Seattle, and telegraphed from there to any part of the contiguous United States. Fort Egbert could receive messages from the United States in 5 days at 56 cents per word.

The trans-Canadian line to Vancouver was completed in June 1901. It was then possible to reach the United States and Washington, D. C., by telegraph directly from Fort Egbert. The Canadian telegraph line was poor throughout its operation, and undependable as line breaks were common. Also it was often difficult to get messages sent promptly through the Canadian system. However, this was the first direct telegraphic communications between Alaska and Washington, D. C., though not an all-American line.

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[1] The following account was taken almost verbatim from a report by William A. Quirk, III, Historical Aspects of the Building of the Washington, D. C.-Alaska Military Cable and Telegraph System, with Special Emphasis on the Eagle-Valdez and Goodpaster Telegraph Lines, 1902-1903, Bureau of Land Management, Fairbanks District Office, May 1974.

During the same period of time, telegraph lines were being constructed from Nome to Fort Davis, a distance of 4 miles, and to Port Safety some 20 miles distant. In 1901, the first sea cable in Alaska was laid 107 miles across Norton Sound to connect Port Safety with Fort Saint Michael. Late in the same year, the 448-mile telegraph line from Fort Saint Michael to Fort Gibbon was completed under the leadership of Lt. George Gibbs.

Telegraph line construction beyond Fort Gibbon toward Eagle was temporarily halted as a route had not been chosen. While telegraph lines from Fort Saint Michael were rapidly being completed eastward to Fort Gibbon, great difficulties were encountered in the building of the Eagle-Valdez line.

Telegraph line construction between Eagle and Valdez became a matter of highest priority. Line completion would bring Valdez, the Prince William Sound region, and the rich Copper River valley into communication with the United States. The line would follow Lt. Henry Allen's Alaska route to the Klondike gold fields, as opposed to following the Canadian route. Lt. Allen had blazed a trail from Valdez to Eagle in 1885. In 1898-99, infantrymen led by Major Abercrombie opened the first 170 miles of Lt. Allen's trail from Valdez to Chistochina and made it usable for pack trains. The road was given the title of Trans-Alaska Military Road.

Captain George Burnell of the Signal Corps and his men began building the telegraph line northward from Valdez in July 1900. They built 37 miles up Keystone Canyon, across Thompson Pass, and into the Copper River valley. Construction work in the summer of 1901 was slowed by the hauling of supplies over the high and rugged Thompson Pass and through swamps in the Copper River valley. Meanwhile, little had been done by a detachment of Army infantrymen who were working southward from Fort Egbert.

In the summer of 1901, Brigadier General A. W. Greely, head of the Signal Corps in Washington, D. C., and a famous Arctic explorer, sent a 21-year-old first lieutenant named William Mitchell to Fort Egbert to investigate the delays in the Alaska telegraph line to the south. Lt. Mitchell (who later became famous as Brigadier General William "Billy" Mitchell of the Army Air Corps for his predictions on the role of air power in warfare) had learned military telegraph line construction while serving in the Philippine Insurrection. He had other military experience in the Spanish-American War.

Lt. Billy Mitchell made his base at Fort Egbert near Eagle for the next 2 years (1901-1903). During this time, he directed construction of the Eagle-Valdez line to the Tanana River, a distance of 153 miles, and directed the exploration and construction of some 204 miles of the Goodpaster line in very difficult terrain.

All stores and equipment—including foodstuffs, hay, oats, special sleds, harnesses, and transport animals (dogs, horses, and mules)--for the telegraph line came up the Yukon in summer by boat and were unloaded at Eagle.

During winter, horses and mules sledded foodstuffs, materials, and equipment from Fort Egbert over the snow and ice to field locations along the Eagle-Valdez line to Tanana Crossing (now Tanacross), a distance of 147 miles. Billy Mitchell set to work to establish the course of the new line. First the line was surveyed, next the right-of-way was chopped, then the wire was run over the snow.

Insulators, brackets, and nails were tied to the wire every quarter of a mile in sufficient quantities for the intervening distance. This was done because in summer, transport animals could not pack the wire and move camps in the same manner as in winter.

As summer 1902 approached, Mitchell's crew dug holes, placed poles in the ground, and elevated the wire at a record pace. On August 24, 1902, Mitchell completed the line to Tanana Crossing. He was met there by Captain George Burnell, who built the line from Valdez. Telegraphic messages could now be sent from Prince William Sound and Valdez through the Fortymile country to Eagle, then retelegraphed over the Canadian line to Vancouver and Seattle. Telegraphic communications from southeast Alaska funneled through Skagway and Whitehorse and down the Canadian line after a new submarine cable was laid from Juneau to Skagway in summer 1902. The remaining link needed was to connect Fort Gibbon and Baker with Eagle.

Preparations were being made in 1902 at Fort Egbert for the final work, the joining of the Fort Egbert-Fort Liscum line to the line from Fort Saint Michael, which at this time extended to Baker on the Tanana River.

Mitchell reconnoitered to determine where the line should be located. On January 1, 1903, he mushed from Eagle to the confluence of the Goodpaster and Tanana Rivers, thus discovering the route along the Goodpaster drainage.

Mitchell and his crew mushed back to Eagle, and he began mobilizing his men. They sledded some 300 tons of supplies 95 miles to the head of the Goodpaster River in preparation for building the line. Work was begun in both directions from this point (now called Summit Station); i.e., from Kechumstuk (the tapoff on the Eagle-Valdez line) to Summit, and from Summit to Big Delta. By the last of April 1903, the wire had been run for the entire distance from Kechumstuk to the mouth of the Goodpaster River. Mitchell expected to meet the party working up the Tanana River, but it had not been able to get within 65 miles of that point due to insurmountable obstacles.

Because the Federal appropriation for the Washington-Alaska Military Cable and Telegraph System ran out on June 30, 1903, Mitchell was determined to finish the last link in the line by that date.

Sufficient supplies and materials had been left at the Goodpaster River in the event the party working up the Tanana River did not reach Mitchell's working party. Mitchell's crew was ordered to build boats from whipsawed lumber at Central Station and, as soon as the ice on the Goodpaster River broke up, to move supplies down the river to the Tanana River. Pack trains were also sent to cooperate in hauling supplies down the Tanana River.

During the month of May, Mitchell's parties, with their pack trains, were working between Kechumstuk and the mouth of the Goodpaster River, putting in poles and elevating the wire. All stations had been chosen, and caches of rations for the working parties and forage for the animals were in place. In addition, a year's supplies for three men and one dog team were carried to each cache along the entire route for maintenance after the line was built.

Mitchell's parties had to reach the Salcha River, some 65 miles away, before the June 30 deadline, and the final run down the Tanana River began on May 31, 1903. Work progressed rapidly in spite of numerous obstacles and serious problems. The crews' meat ran out, but they obtained caribou and bear meat as substitutes. Mosquitoes were nearly intolerable for both men and animals, and long smoky fires were built to keep the insects away. Getting the boats through the Bates Rapids on the Tanana River took special care. On June 10, when the line was half finished, a forest fire more than 250 miles long burned in the direction of the line. After June 10, the men worked through the fire and, in some places, carried the wire through the smoking embers by galloping through on a mule.

On June 27, 1903, near the Salcha River, Lt. Mitchell met Lt. Gibbs, who was working up the Tanana River from Fairbanks and the final connection was made.

The Trans-Alaska Telegraph System comprised some 1,447 miles of overland lines and a few hundred miles of submarine cable. Telegraphic messages could be sent to Eagle from Nome and Fort Saint Michael on the Bering Sea; up the Yukon and Tanana Rivers to Fort Gibbon, then Fairbanks; and from Prince William Sound and Valdez. From Eagle, these messages were channeled through the Canadian line to Vancouver and Seattle, and on to Washington, D. C., and the rest of the United States.

All of the telegraph lines had been constructed in just 3 years, 1 month, and 1 day. The line builders faced tremendous hardships and difficulties. Supplying all materials over interior Alaska in winter by sledding or pack animals, over the roughest, most primitive trails in undeveloped country, was a tremendous task in itself. The work was led by Captain George Burnell and Lts. William Mitchell and George Gibbs, and, at various times, by the 3rd, 7th, 8th, 10th, and 13th Infantries.

Wire, insulators, brackets, nails, foodstuffs, hay, oats, and other supplies were often transported long distances. All supplies and equipment for the 428-mile Eagle-Valdez Telegraph Line were hauled 168 miles south from Eagle or 260 miles north from Valdez to Tanana Crossing. In constructing the Goodpaster Telegraph Line, Mitchell's crew transported supplies 273 miles from Eagle.

In 1903, Congress appropriated funds for the construction of submarine cables from Juneau to Sitka and from Sitka to Seattle, a total distance of 1,377 miles. It was not until 1904 that these lines were completed. Another appropriation in April 1904 provided for construction of a cable from Sitka to Valdez, a distance of 600 miles. This line was laid in the Gulf of Alaska and was completed in October 1904, thus completing an all-American line of telegraph communications.

The original submarine cable laid in Norton Sound in 1901 was ruptured when the ice went out in the summer 1902. After private companies gave up, the Signal Corps continued to work on wireless radio across the Norton Sound. In August 1903, Captain Wildman succeeded in making contact with St. Michael from Port Safety, 107 miles away. This achievement represented the first long distance wireless telegraphy in the United States.

Military records indicate land lines in Alaska were estimated to have cost the government $617 per mile, while submarine cables cost $452 per mile. Annual maintenance of these telegraph lines cost $6.25 per mile. During one of the early years, there were more than 200 interruptions of telegraph service with causes divided almost equally among blizzards, forest fires, sleet storms, high winds, and vandalism.

The line was maintained by detachments of soldiers stationed at log cabins every 40 miles. Each detachment was made up of one Signal Corps repairman and two assistants from the Army. A sled and dog team of seven dogs were used for winter transportation. Relief cabins for shelter from the frequent blizzards were located between the repair cabins. When service over the line was broken, a repairman and infantryman started out from the cabins on each side of the break. The first man to reach the fault made repairs and awaited the arrival of the other party. After contact was established, both crews returned to their stations.

By September 1910, there were some 1,506 miles of land lines, 2,630 miles of submarine cables, and wireless telegraphy covering 934 miles.

Old telegraph station still remaining in Forty Mile River area. (Bureau of Outdoor Recreation)

TABLE IV. The Land Line, Wireless, and Submarine Cable Components of WAMCATS in 1904

	MILES	TOTAL MILES
Land Lines		
Nome-Kechumstuk	933	
Fort Gibbon-Baker	125	
Eagle-Valdez	428	
Fort Egbert-Boundary	11	
Total Land Telegraph Lines		1,497
Wireless Telegraphy (Radio)		
Port Safety-St. Michael		107
Submarine Cable		
Seattle-Sitka	1,070	
Sitka-Valdez	640	
Sitka-Juneau	291	
Juneau-Fort Seward (Haines)	102	
Fort Seward-Skagway	21	
Total Submarine Cable		2,124
Total Mileage in WAMCATS		3,728

At that time, wireless telegraphy began to supplant the land and sea cable system.

Period of Use

Between 1903 and 1910, the original WAMCATS system performed most ably. During the year ending June 30, 1906, a total of 306,454 messages were handled, including 253,338 commercial and 53,116 military. Even until 1921, most messages within Alaska and from Alaska to the United States involved portions of the line between Eagle and Valdez. However, by 1907, it had become evident that maintenance costs for the land lines would continue to be exceedingly high and that wireless communications appeared feasible. In 1911, the Gulkana-Fort Egbert telegraph line, totaling some 290 miles, was abandoned in favor of wireless with an estimated savings of $50,000 annually. By 1915, there were only 848 miles of land line in operation within Alaska. A major portion of this comprised the line between Fort Liscum and Fairbanks along the 375-mile long Valdez to Fairbanks Trail (Richardson Highway). In 1923, the military recommended transferring the Valdez-Fairbanks line to the Alaska Road Commission for conversion to telephone service. The final transfer of the Valdez-Fairbanks telegraph line took place in 1926.

In the early 1900's, portions of the original telegraph route appear to have been used for trail access to the Fortymile gold fields.

Historical Trail Remnants

Most of the area traversed by the three study segments is largely isolated and appears much as when the original construction took place in 1900-1903.

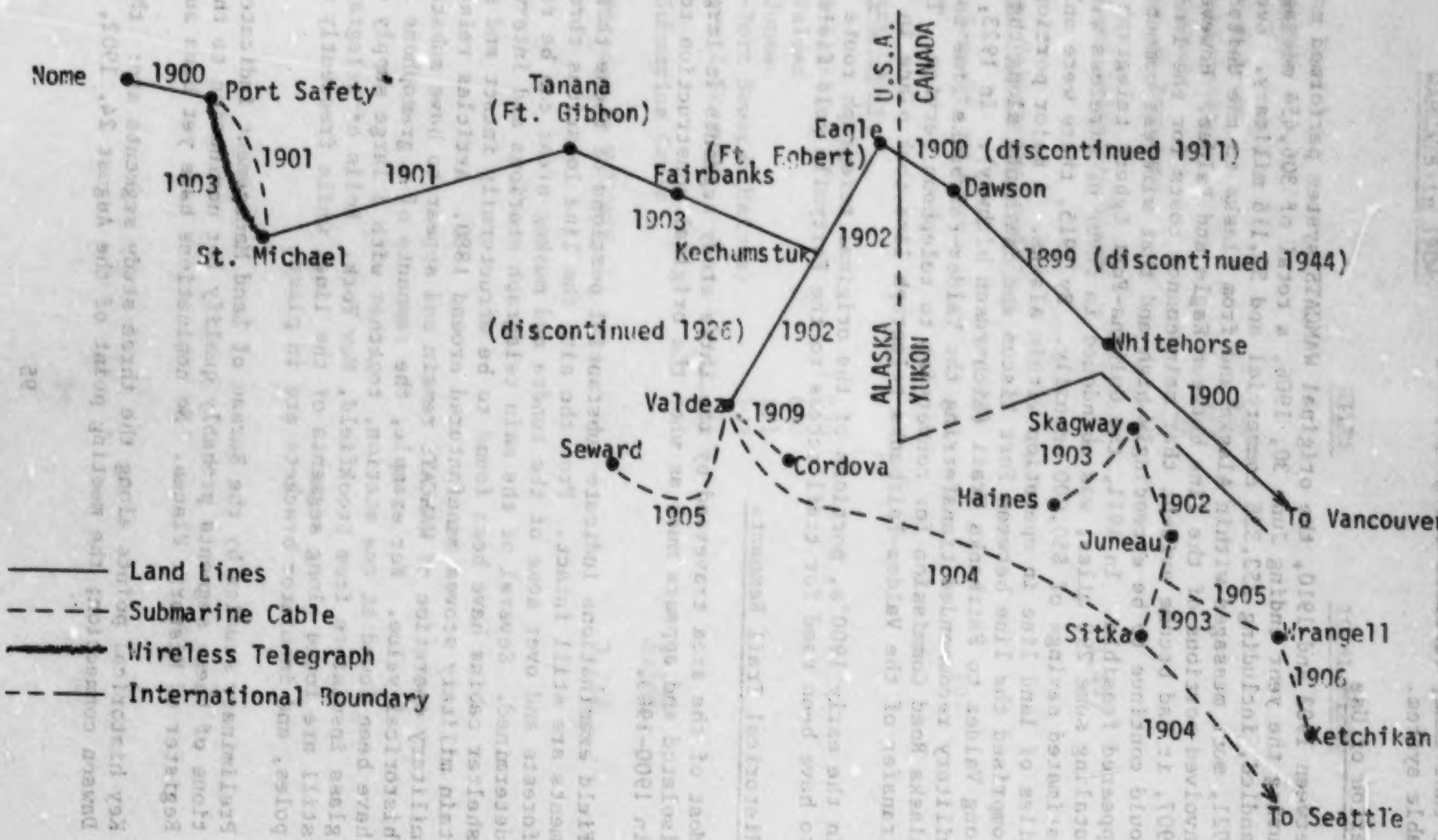
Field examinations indicate substantial portions of these three segments are still intact. From the air, the line locations through spruce forests and over some of the tundra and muskeg areas can be readily determined. Several of the main telegraph stations and intervening shelter cabins have been found to be structurally intact and still contain military stoves manufactured around 1880. Articles related to military operation of WAMCATS remain and appear to have substantial historical value. For example, the remnants of a gramophone instrument have been found at one station, together with a large supply of green glass insulators from Brookfield, New York. Rolls of telegraph wire still are found along segments of the line, while frequently wire, poles, and insulator brackets are in place.

Preliminary studies by the Bureau of Land Management indicate that portions of these segments probably qualify for nomination to the National Register of Historic Places. No nominations have yet been submitted.

Key historical points along the three study segments are: the Alaska-Dawson connection; the meeting point of the August 24, 1902, linkage

A sketch showing completion dates of the

Washington-Alaska Military Cable and Telegraph System


Nome
1900
Port Safety
1901
1903
St. Michael
1901
Tanana
(Ft. Gibbon)
Fairbanks
1903
Kechumstuk
Eagle
(Ft. Egbert)
U.S.A.
CANADA
ALASKA
YUKON
1900 (discontinued 1911)
Dawson
1902
1899 (discontinued 1944)
(discontinued 1926)
1902
Whitehorse
1900
Valdez
1909
Seward
Cordova
1905
Skagway
1903
Haines
1902
To Vancouver
Juneau
1904
1905
1903
Sitka
Wrangell
1906
1904
Ketchikan
To Seattle
Land Lines
Submarine Cable
Wireless Telegraph
International Boundary

of the Fort Egbert-Fort Liscum line near Tanacross; Kechumstuk, the main interconnection between telegraphic messages involving western Alaska forts, the rest of Alaska, and the outside; Fort Egbert, the major supply distribution point for construction of significant portions of the Fort Egbert-Fort Liscum-Fort Gibbon-Dawson lines; Summit Station, the primary supply depot and starting point for constructing the Goodpaster line; at least 13 primary telegraph relay stations; an unknown number of emergency shelters; and substantial tangible evidence of the original line locations as well as alternative routings and key segments where wire insulators and poles remain intact.

Related Historic Sites

The Eagle National Historic District, including the entire Fort Egbert site was placed on the National Register of Historic Places in 1972. The Eagle area is also a key element of the proposed Yukon-Charley National Rivers extending from the vicinity of the United States border to Circle.

There are substantial and significant international values associated with the Canadian gold fields at Dawson and Canadian historic and park programs associated with Dawson and the Fort Cudahay-Fortymile sites.

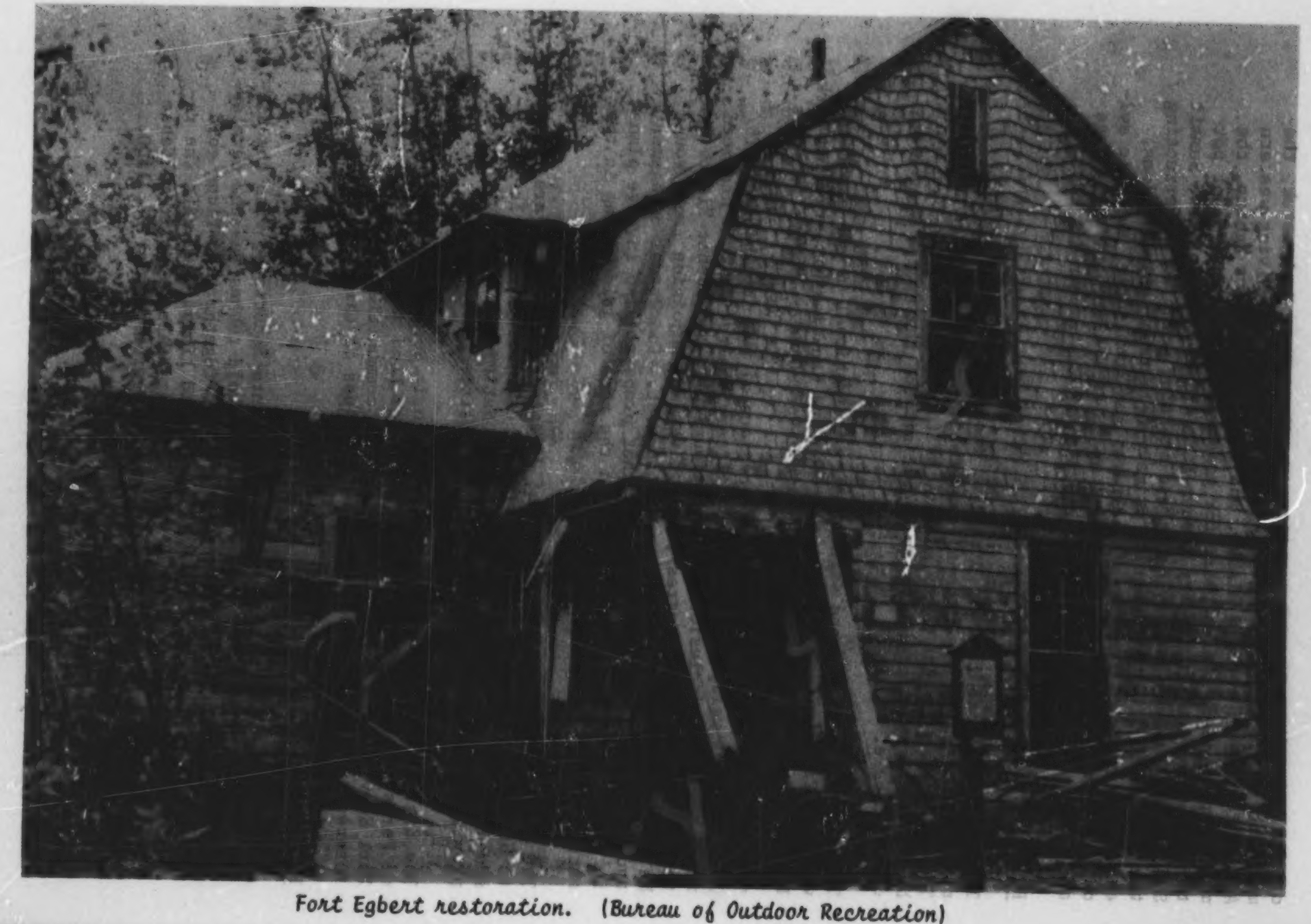
The Fortymile River, encompassing portions of the original WAMCATS line, several relay stations, and military shelter cabins, has been recommended for inclusion in the National Wild and Scenic Rivers System. If approved by Congress, this river and adjoining lands would be managed by the Bureau of Land Management. Conceptual management and development plans prepared for that proposal also involve plans to protect and interpret WAMCATS and the role of gold mining in the settlement of Alaska.

The abandoned Native communities of Joseph and Kechumstuk are believed to have substantial Native historic and cultural values. It is presumed that both sites will be placed in Native ownership under the provisions of the Alaska Native Claims Settlement Act.

The Eagle Historic Society, Chicken Historic Society, Alaska Division of Parks, National Park Service, Bureau of Land Management, Canadian Park Service, and several Alaskan Native communities all have a strong interest in the historic and cultural values of this area.

Historical Significance

One of the most important and lasting events associated with the discovery of gold in Alaska and the ensuing gold rushes was the development of a communications system which tied together far-flung gold fields and military posts within Alaska and linked them with the remainder of the United States. The Washington-Alaska Military Cable and Telegraph System, authorized by the Congress on May 26, 1900,



Fort Egbert restoration. (Bureau of Outdoor Recreation) commemorates an unparalleled effort in the annals of telegraphic engineering due to the large scope of the effort and the challenge of constructing and operating reliable, quick communication in an unknown and largely uninhabited region.

PRESENT AND PROSPECTIVE TRAIL USES

Present Trail Condition

Most of the WAMCATS overland route involved in the three study segments is in a run down condition having been substantially without maintenance since abandonment around 1911. Small portions, notably in the Mentasta Pass area, Kechumstuk, and lower Goodpaster River, have been converted to primitive trails for vehicular access and/or winter haul roads. Current editions of U. S. Geological Survey maps indicate a network of trails in the upper Fortymile drainage. On-the-ground inspection revealed that these trails follow the original telegraph line.

Through forested areas, the slow regeneration of trees where the line was constructed makes much of the route readily visible from the air. In alpine and muskeg areas, location is more difficult.

Scenic and Recreational Qualities

The three segments have a diverse and pleasing array of scenic values ranging from the Yukon and Tanana Rivers to sweeping vistas of the Alaska Range in the tundra divide of the Fortymile drainages.

Ground checks of the original route in selected parts of the Fortymile drainage indicated those portions have substantial recreation potential as hiking trails and perhaps horseback trails. Since the WAMCATS line was designed to be serviced on foot, mule, snowshoe, or dogsled, adverse terrain features were avoided whenever possible. However, many crossings of steep ravines, rivers, and muskeg could not be avoided.

As most portions of the WAMCATS route are well removed from the existing highways, the route provides access into areas which are still primitive and undeveloped. Opportunities to view wildlife--ranging from Dall sheep in the higher elevations near Mentasta and Eagle to moose, wolves, caribou, and numerous smaller animals and birds—are excellent. There are many interesting geological and floral features.

Recreational Uses

Except for visitors to the Eagle area, present recreational use of the three segments is almost nonexistent. Some of the route is used for hunter and fisherman access, principally in the Kechumstuk area. While there are no records, this use probably does not exceed 20 recreation days annually. Poor access and lack of public knowledge of the area are the principal reasons for the light use.

Old English

Gramaphone cylinder and tobacco cans found in the Forty Mile River area. (Bureau of Outdoor Recreation)

Future potential recreational use could include hiking, horseback riding, cross-country skiing, dog mushing, and snowshoeing. Portions of the route could also be used by riders of snowmachines in winter and trail bikes in summer.

Nonrecreational Uses

Portions of the line are being utilized for vehicular access to mining claims and trapping headquarters. At present, these uses involve only a minor amount of the 376 miles included in this analysis.

Several of the main relay stations, and possibly emergency shelters, constructed by the military are included within pending applications under the 1906 Native Allotment Act. Therefore, it is likely that some of the historic structures associated with WAMCATS will pass into private ownership.

In July 1973, the Alaska Department of Highways submitted to the Joint Federal-State Land Use Planning Commission long-range plans to construct a highway affecting the route. These plans include a substantial portion of the original, largely unaltered portion of WAMCATS in the Goodpaster drainage and the Fortymile River basin. However, the Department of Highways, by letter of December 3, 1974, to the Bureau of Outdoor Recreation, stated that present planning indicates if a highway is ever built in the corridor, the Salcha rather than the Goodpaster drainage system would be followed. A highway in the Salcha River drainage would have minimal effects on WAMCATS.

CONCLUSIONS AND RECOMMENDATIONS

Qualification for National Scenic Trail Designation

The criteria used in evaluating the WAMCATS Trail are as follows:

Criterion: Because of their special characteristics, National Scenic Trails should be nationally significant and be capable of attracting visitors from throughout the United States.

Finding: The three segments of WAMCATS totaling 376 miles are of national historic significance in their relationship to the settlement and exploration of Alaska during the stampedes of gold seekers to and from the Alaskan and Canadian gold fields and capable of attracting visitors from throughout the United States. A wide variety of high quality outdoor recreation opportunities for hiking, horseback riding, cross-country skiing, snowshoeing, dogsledding, nature study, and geological study in a largely natural, scenic portion of Alaska are found along these three segments.

Criterion: National Scenic Trails are designated for hiking and other compatible uses. The National Trails System Act prohibits the use of motorized equipment on these trails, except in certain circumstances.

Finding: The historic route is largely undeveloped at present, although much of the trail, lines, and cabins remain intact, making it feasible to develop a trail along the general route for hiking and other compatible purposes.

Criterion: National Scenic Trails of historical importance should adhere as accurately as possible to their principal historic routes.

Finding: The routes from Fort Egbert to the United States/Canada border comprising 11 miles, Fort Egbert to Slana comprising 220 miles, and Kechumstuk to Quartz Lake comprising 145 miles follow the original location of key sections of WAMCATS.

Criterion: National Scenic Trails should be provided with adequate public access through connecting local or regional trails. Access should be located at reasonable intervals to provide for trips of various lengths.

Finding: Access to the Eagle-Fort Egbert area is by auto over the Taylor Highway and by air. A small airstrip at Joseph provides access to the central portion of the Kechumstuk-Quartz Lake segment while the Richardson Highway provides auto access to the Quartz Lake area. The Alaska Highway intersects WAMCATS at Tanacross, while the Glenn Highway provides good access in the Mentasta-Slana area. The Alaska, Richardson, and Glenn Highways are paved roads open to year-around travel. The Taylor Highway is unpaved and not maintained during the winter months.

Criterion: National Scenic Trails should be primarily land based.

Finding: The 376-mile segment of WAMCATS is, except for river crossings, land based in its entirety. A major river, the Tanana, is crossed. Several tributaries to the Fortymile are also crossed.

Criterion: National Scenic Trails should be of sufficient length to encompass and provide appropriate access to the resources which are a basis for the trail's designation.

Finding: The three study links total approximately 376 miles.

Criterion: National Scenic Trails should be continuous except where no practicable or feasible interconnection exists.

Finding: The 376 miles are interconnected and could be considered as continuous.

Conclusions

The history of WAMCATS is fascinating and many people could receive a valuable and enjoyable experience by viewing some of the remaining traces and having these interpreted. A number of the main telegraph stations, intervening shelter cabins, and telegraph poles are intact. The remnants, however, are somewhat repetitive.

WAMCATS should not be designated as a National Historic Trail. That category should be open only to routes which made history as trails. WAMCATS served primarily as a telegraph line and not as a trail.

Recommendations

The historical importance of WAMCATS is undisputed. The question is how to protect and provide for its interpretation. Protection of the remaining remnants should be a prime consideration in future land use planning by the Bureau of Land Management. Many structures of the era exist in Eagle and some are being rehabilitated. The Bureau plans to interpret these structures and tell the story of WAMCATS. They also plan to display relics from the telegraph line. In conjunction with this, the Bureau should consider developing spur trails from the Taylor Highway to locations on the line and perhaps for short distances along the line. Interpretive signing should be done at these locations. It would be desirable if some of these trails pass a shelter cabin and should be located where some poles are still standing and the old line route is easily identified. No further consideration should be given to WAMCATS as a potential National Scenic Trail or as a National Historic Trail.

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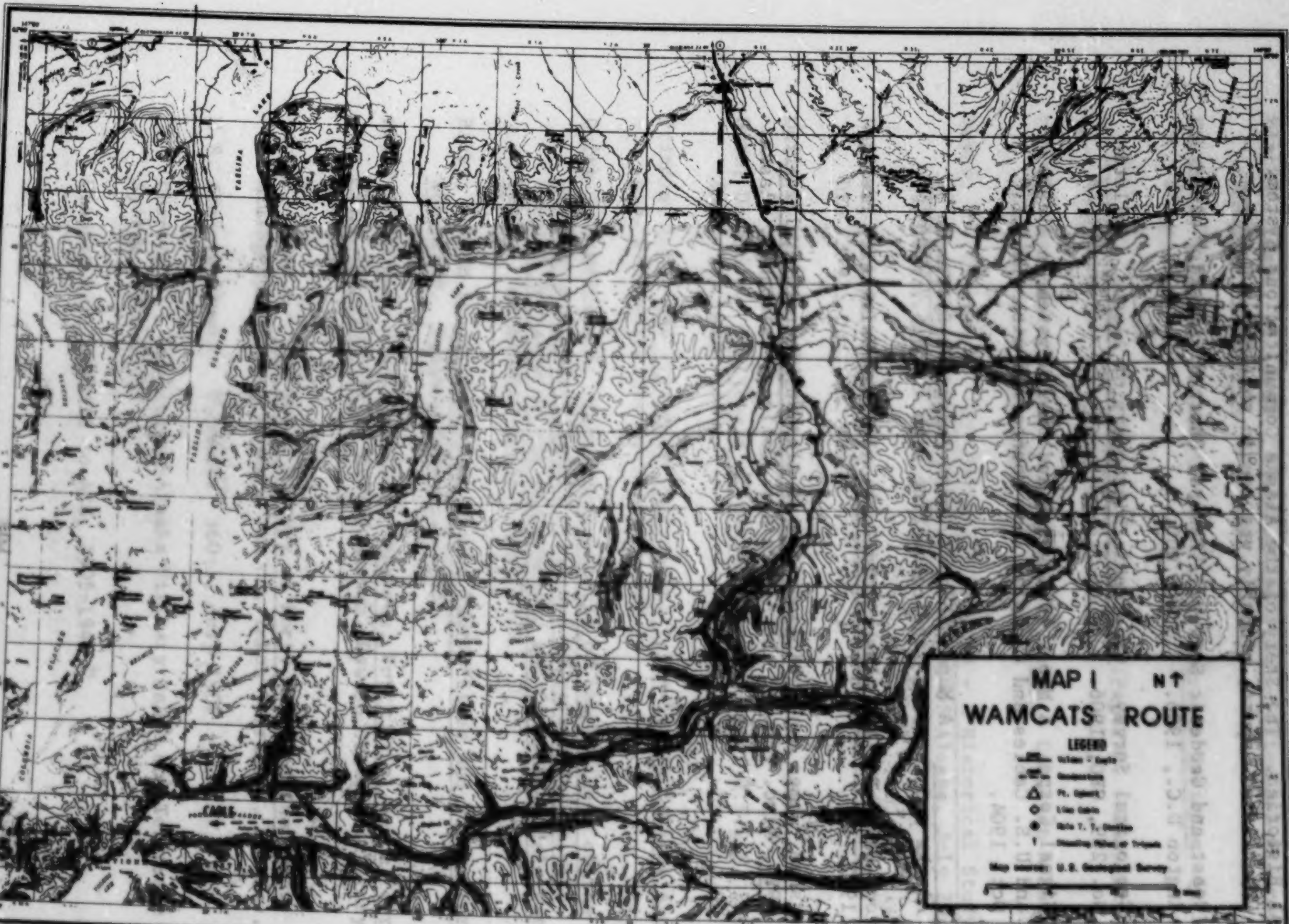
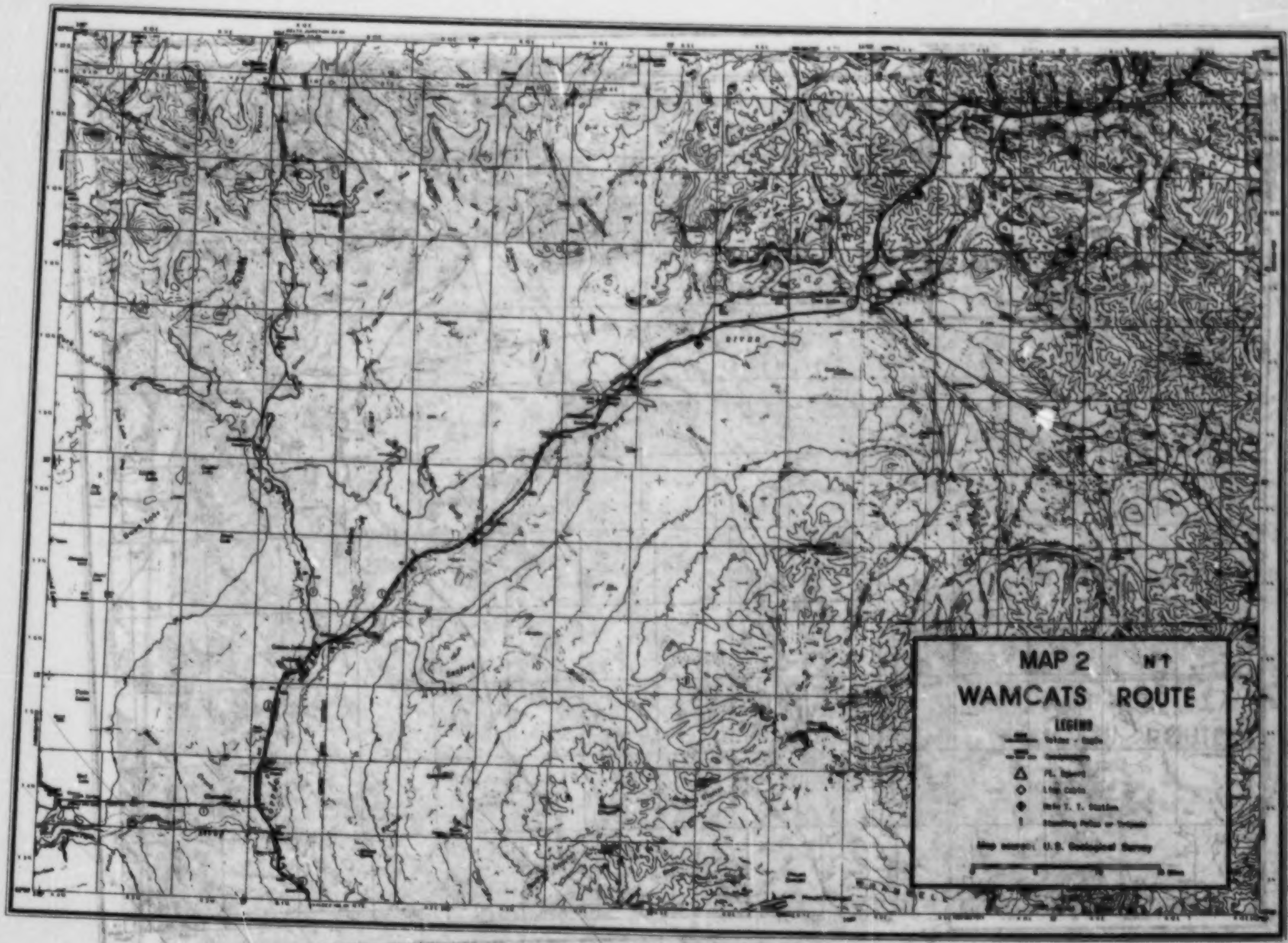
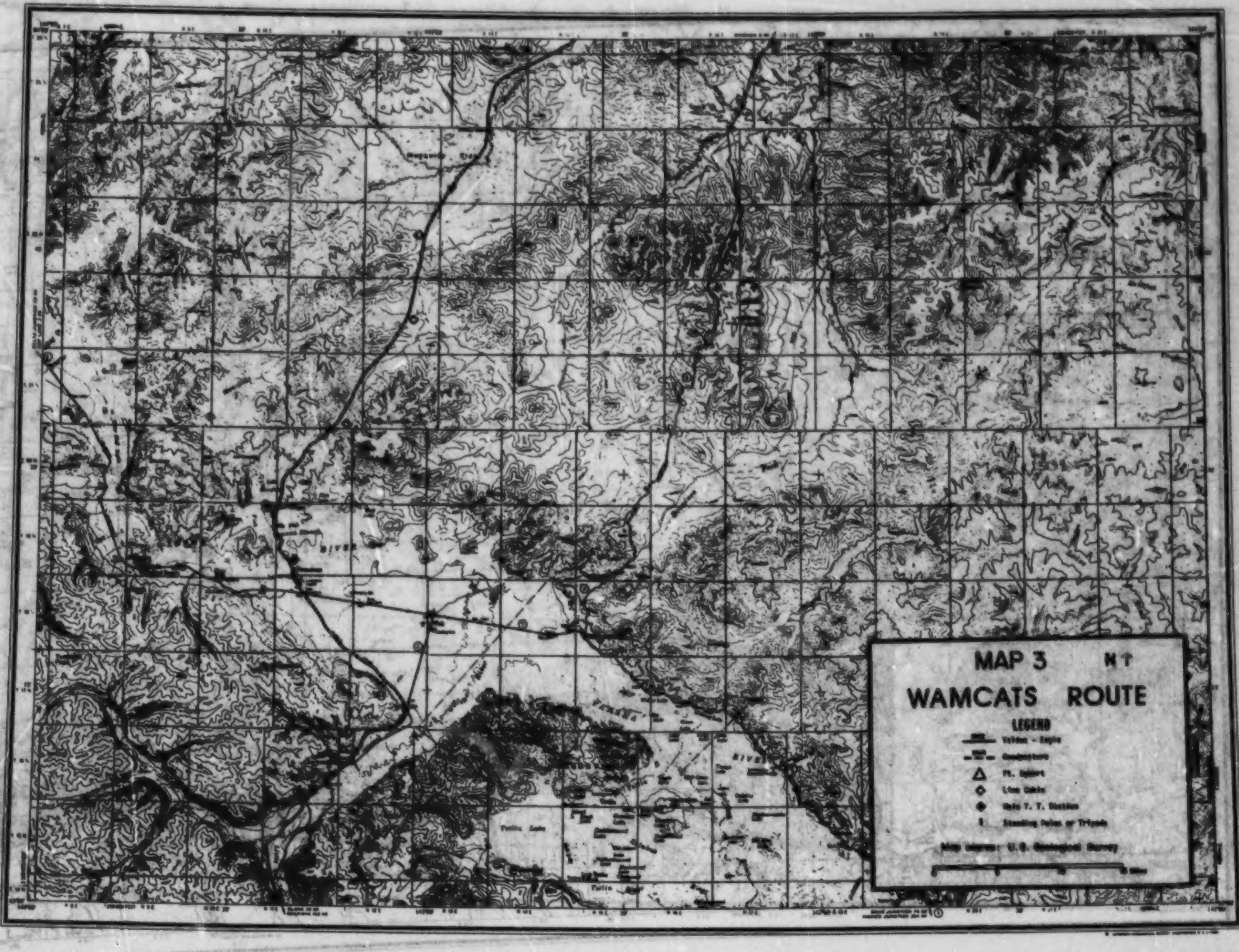
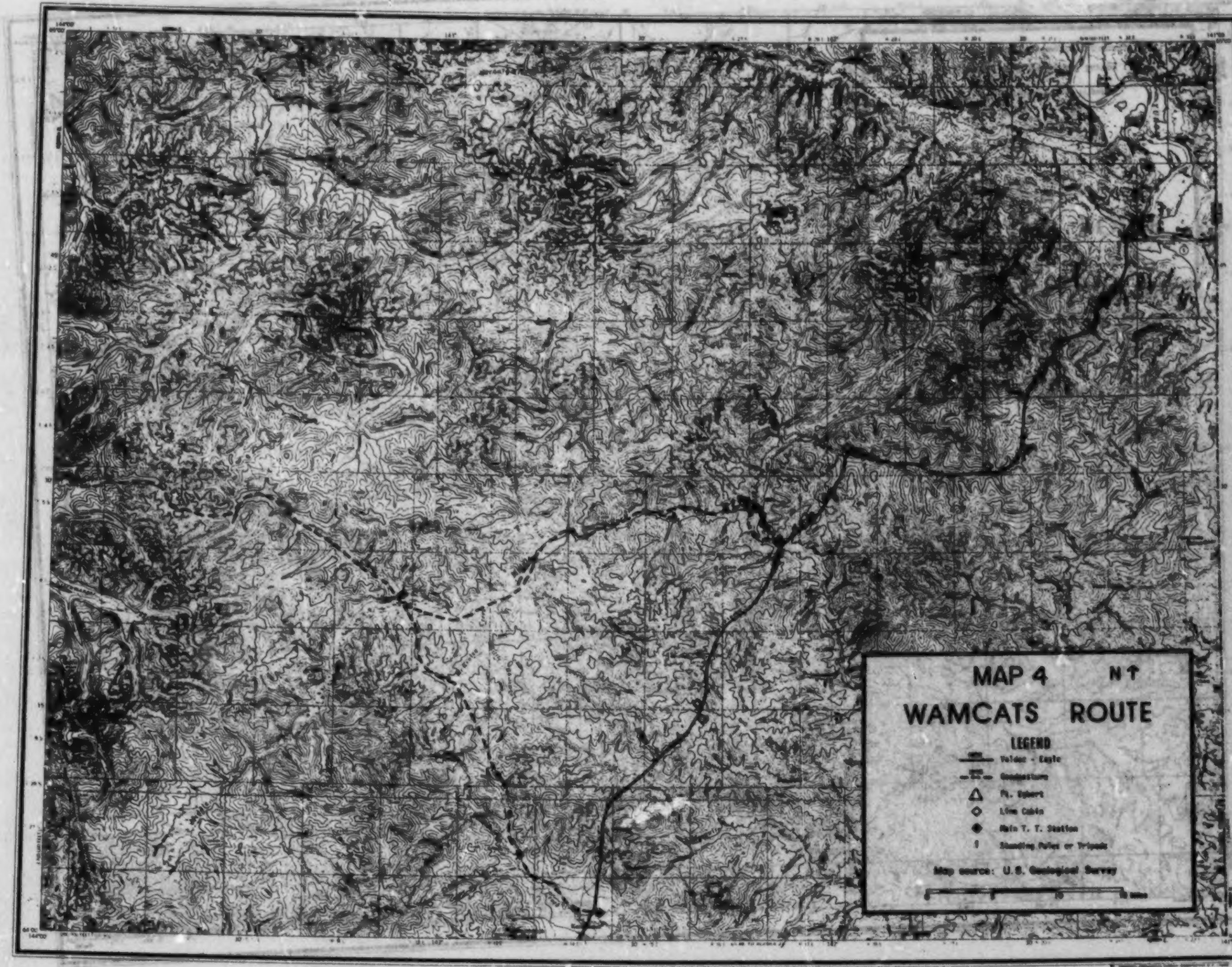

MAP I
N↑
WAMCATS ROUTE
LEGEND
Valdez - Eagle
Ft. Egbert
Line Cabin
Standing Poles or Tripods
Map source: U.S. Geological Survey
EAGLE


MAP 2
N
WAMCATS ROUTE
LEGEND
Telephone - Cable
Ft. Egbert
Log Cabin
Relay T. T. Station
Standing Poles or Tripods
Map source: U.S. Geological Survey
River


MAP 3 N↑
WAMCATS ROUTE
LEGEND
Valdez - Eagle
[illegible]
Ft. Egbert
Line Cabin
Radio T. T. Station
Standing Poles or Tripods
Map source: U.S. Geological Survey
River
Tetlin Lake


MAP 4
N ↑
WAMCATS ROUTE
LEGEND
Valdez - Eagle
Goodpasture
Ft. Egbert
Line Cabin
Main T. T. Station
Standing Poles or Tripods
Map source: U.S. Geological Survey
0
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10
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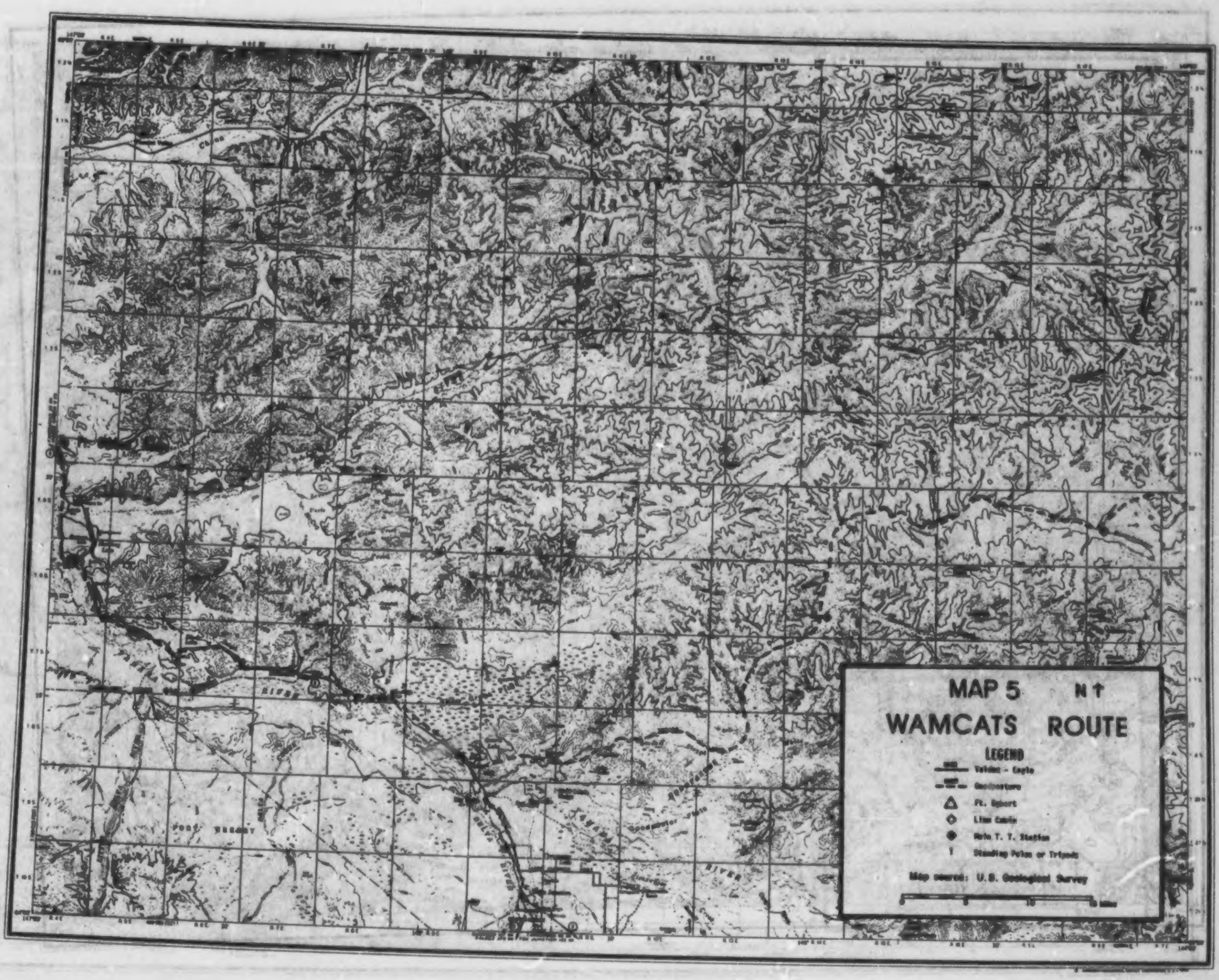
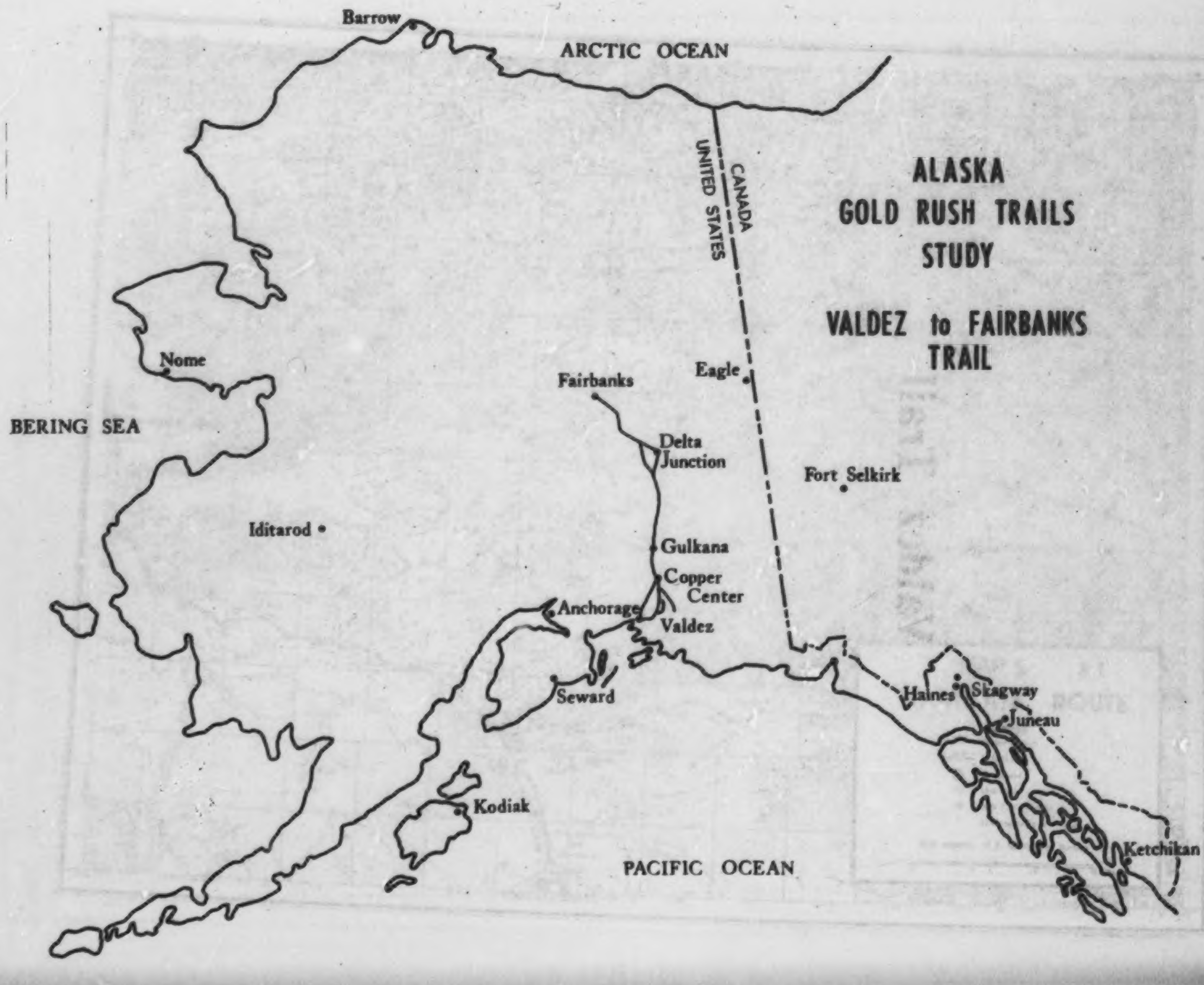

MAP 5
N ↑
WAMCATS ROUTE
LEGEND
Valdez - Eagle
Goodpaster
Ft. Egbert
Line Cabin
Relay T. T. Station
Standing Poles or Tripods
Map source: U.S. Geological Survey
0
5
10
15 Miles
FORT EGBERT
RIVER

Valdez Trail

ALASKA
GOLD RUSH TRAILS
STUDY

VALDEZ to FAIRBANKS
TRAIL


Barrow
ARCTIC OCEAN
CANADA
UNITED STATES
Nome
BERING SEA
Fairbanks
Eagle
Delta
Junction
Fort Selkirk
Iditarod
Gulkana
Copper
Center
Anchorage
Valdez
Seward
Haines
Skagway
Juneau
Kodiak
Ketchikan
PACIFIC OCEAN

VALDEZ TRAIL (VALDEZ TO FAIRBANKS)

BACKGROUND

Alaska was purchased by the U. S. Government from Russia in 1867. For at least two decades following, the purchasers knew little about most of interior Alaska since the Russians had concentrated along the islands and coastal areas, particularly in Alaska's panhandle. Early explorations into the interior were conducted along the Yukon River. The first official exploration in the area of what was to become the Valdez Trail occurred in the summer of 1884. Lieutenant William R. Abercrombie, U. S. Army, was instructed to lead a party making a reconnaissance of the Copper River. Lieutenant Abercrombie explored the Copper River, reaching a position of latitude 60°41' on the river, then returned to Nuchek on Hinchinbrook Island. The party also made explorations in the direction of what is now Valdez.

The U. S. Army, in 1885, sent Second Lieutenant Henry T. Allen to further explore the interior. He proceeded to travel up the Copper River and down the Tanana River valley exploring the Chitina River and other tributaries. Lieutenant Allen met some early prospectors along the Copper River, most notably John Bremner, after whom the Bremner River is named.

Alaska, in the 19th Century, remained an undeveloped country. Other than U. S. military activity, gold seekers seemed to be almost the only persons from the outside interested in Alaska. Because of the prospectors in the Yukon, Tanana, and Copper River areas, the U. S. Army, in 1898, ordered further explorations in order to provide better access, communication, and other aid to these people. Captains Abercrombie and Glenn were ordered to further explore up the Copper River from Valdez. One of the objectives was to find an all-American route (trail) from Valdez to the Yukon. Valdez had come into being November 10, 1897, when ship passengers landed near what was to become Fort Liscum. Construction of Fort Liscum was started in the spring of 1900, almost 3 years later.

Transportation to the gold fields in Alaska and to the Klondike in Canada was mainly by river and was to remain so. However, additional non-water routes were necessary, particularly to an ice-free winter port. Although the Valdez to the Yukon (Fort Egbert, later Eagle) route was explored earlier, it was not until 1900 that an actual trail was started. The trail was independent of the military communications lines (WAMCATS), although both were being built during the same period, between the same settlements, and in some places were close together. The all-American route was originally to go from Valdez to Fort Egbert on the Yukon. Because of gold strikes around Fairbanks and the growing importance of that area, the main line was diverted at Gulkana (mile 128) and rerouted to Fairbanks. Although the trail was started by the military and was originally planned to be used as a military road, interest and use by nonmilitary made it a general use route, almost from the beginning. The Valdez to Fairbanks trail eventually developed into the present-day Richardson Highway, named after General Wilds P. Richardson, the man credited with guiding the construction of the route.

LOCATION AND REGIONAL ENVIRONMENT

General Alignment

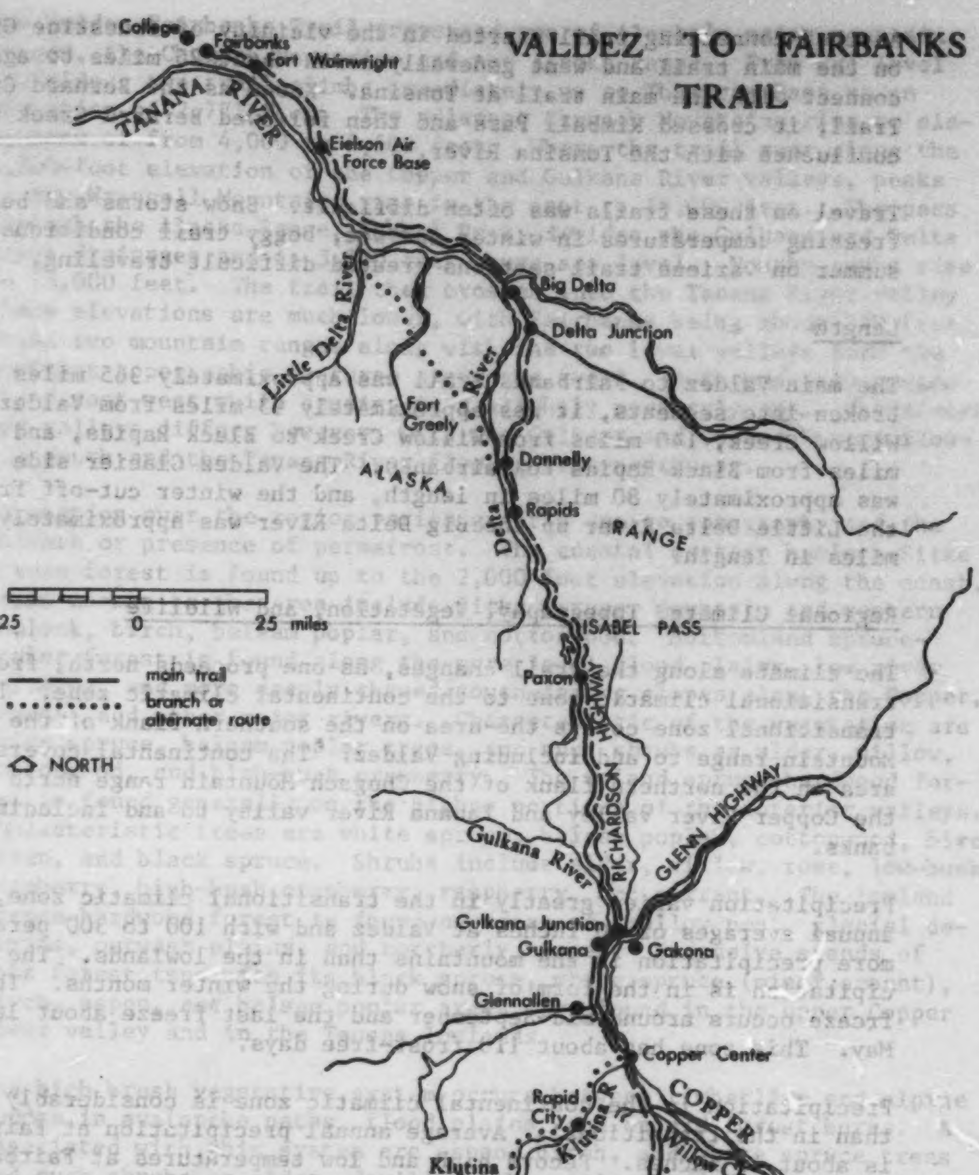
The accompanying maps outline the known trails from Valdez to Fairbanks. The main route and two shorter side routes formed the major trail from Valdez to Fairbanks. All were used during the Gold Rush Era.

The main Valdez to Fairbanks Trail left Valdez, crossed the Valdez Glacier delta, up through Keystone Canyon, and up the Lowe River valley to Thompson Pass, in the Chugach Mountains. From here, the trail passed through the Tsina River and Tiekel River gorges, and then followed the Tiekel valley crossing the Tonsina River to Willow Creek. Continuing northward, it crossed the Klutina River and paralleled the Copper River. The trail crossed the Tazlina River and followed the west bank of the Copper River to the Gulkana River. It crossed the Gulkana at its mouth, then paralleled this river to its headwaters. The trail went over Isabel Pass, through the Alaska Range, and then along the Big Delta River to its confluence with the Tanana River. The trail crossed to the north bank of the Tanana River and followed the river to Fairbanks.

One of the shorter side routes from the main trail was a winter alternative route along the northern end of the main trail. It was used because it saved 13 miles, was fairly level, and was protected from winter storms. This side route cut off at Little Delta River and headed south to a point approximately 35 miles up the Delta River.

The other major side route was the one first used by the early prospectors in 1896-98 who went to Valdez by ship, planning then to go north via the Copper River to the gold fields. This side route left Valdez, went north across Valdez Glacier and the Chugach Mountains, down Klutina Glacier to Klutina Lake, then by boat down the Klutina River to what was to become Copper Center at the confluence of the Klutina River with the Copper River. At this point, this side route, known as the Valdez Glacier Trail and later called the Death Trail of '98, rejoined the main Valdez to Fairbanks Trail.

An important connecting trail led to the copper fields in the Chitina and Copper River valleys. This connecting trail started at Willow Creek on the Valdez to Fairbanks trail and went southeast approximately 39 miles to the present-day town of Chitina.



VALDEZ TO FAIRBANKS TRAIL

College
Fairbanks
Fort Wainwright
TANANA RIVER
Eielson Air Force Base
Little Delta River
Big Delta
Delta Junction
Delta River
Fort Greely
Donnelly
ALASKA RANGE
Rapids
25
0
25 miles
ISABEL PASS
Paxon
RICHARDSON HIGHWAY
main trail
branch or alternate route
NORTH
GLENN HIGHWAY
Gulkana River
Gulkana Junction
Gulkana
Gakona
Glennallen
Copper Center
COPPER RIVER
Rapid City
Klutina R.
Klutina Lake
Willow Cr.
Bernard Creek Trail
Chitina
Chitina River
CHUGACH MOUNTAINS
Tiekel R.
Tsina
Valdez Glacier
Valdez
Thompson Pass
Keystone Canyon
Lowe River

Another connecting trail started in the vicinity of Ernestine Creek on the main trail and went generally north about 25 miles to again connect with the main trail at Tonsina. Known as the Bernard Creek Trail, it crossed Kimball Pass and then followed Bernard Creek to its confluence with the Tonsina River.

Travel on these trails was often difficult. Snow storms and below freezing temperatures in winter and wet, boggy trail conditions in summer on various trail sections created difficult traveling.

Length

The main Valdez to Fairbanks Trail was approximately 365 miles long. Broken into segments, it was approximately 93 miles from Valdez to Willow Creek, 140 miles from Willow Creek to Black Rapids, and 132 miles from Black Rapids to Fairbanks. The Valdez Glacier side trail was approximately 80 miles in length, and the winter cut-off from the Little Delta River up the Big Delta River was approximately 55 miles in length.

Regional Climate, Topography, Vegetation, and Wildlife

The climate along the trail changes, as one proceeds north, from the transitional climatic zone to the continental climatic zone. The transitional zone covers the area on the southern flank of the Chugach Mountain range to and including Valdez. The continental covers the area on the northern flank of the Chugach Mountain range north through the Copper River valley and Tanana River valley to and including Fairbanks.

Precipitation varies greatly in the transitional climatic zone, with annual averages of 60 inches at Valdez and with 100 to 300 percent more precipitation in the mountains than in the lowlands. The precipitation is in the form of snow during the winter months. The first freeze occurs around mid-September and the last freeze about late May. This zone has about 110 frost-free days.

Precipitation in the continental climatic zone is considerably less than in the transitional. Average annual precipitation at Fairbanks is about 11 inches. Record high and low temperatures at Fairbanks are 99°F and -65°F, with a mean daily January temperature of about -16°F and a mean daily July temperature of about 60°F. The first freeze occurs around September 1 and the last freeze around May 20. This zone has about 89 frost-free days.

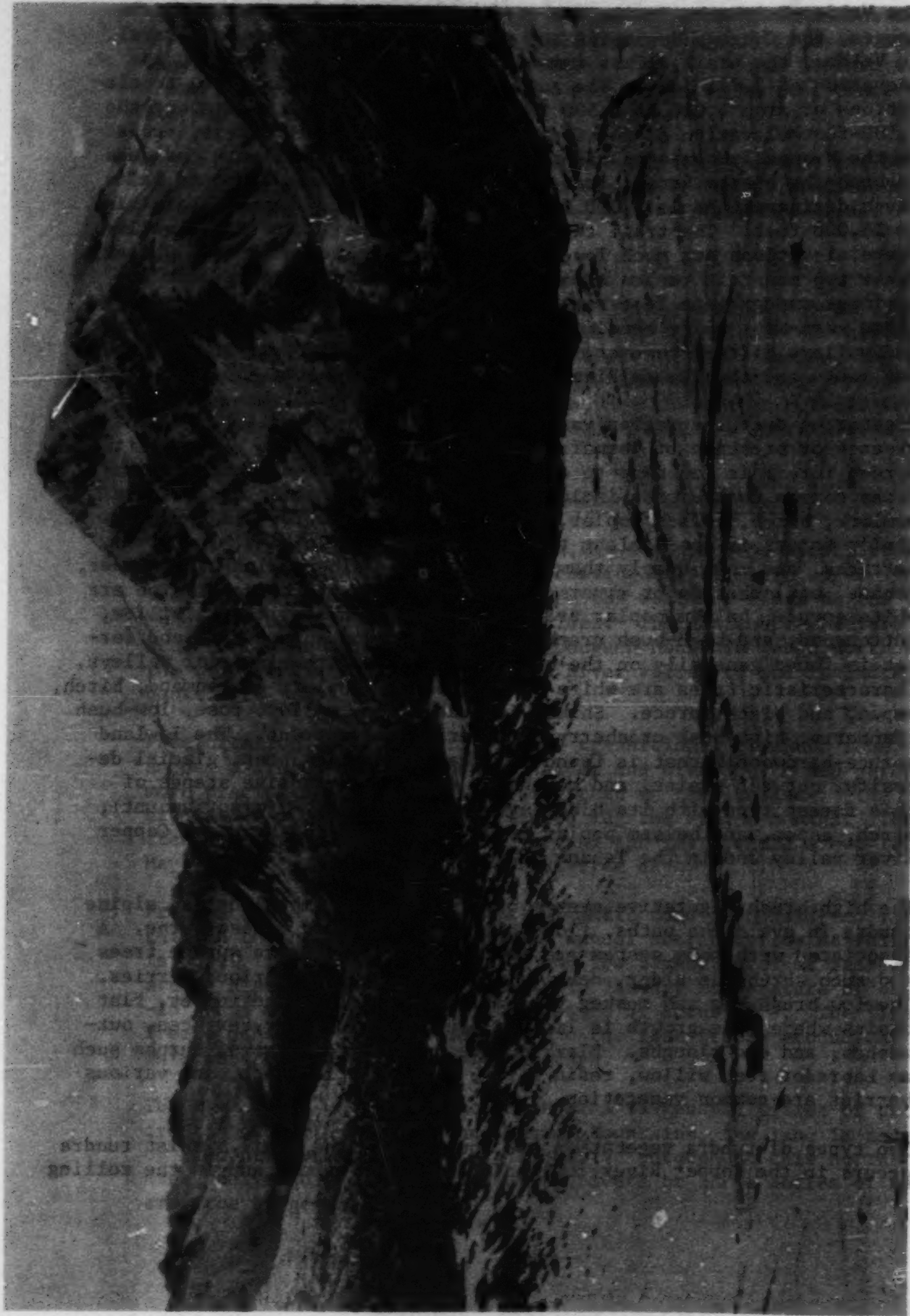
The area south of the Chugach Mountains is generally free of permafrost; however, north of the Chugach Mountains, the land is underlain by discontinuous permafrost. Generally, throughout this northern area, only those places adjacent to rivers or large bodies of water are free of permafrost.

The Valdez-Fairbanks Trail traversed two of Alaska's major mountain ranges, the Chugach Mountains and the Alaska Range. From sea level at Valdez, the trail climbs immediately up to Thompson Pass at an elevation of 2,771 feet. The adjacent Chugach Mountains rise to elevations of from 4,000 to 8,500 feet. Where the trail runs along the 1,500-foot elevation of the Copper and Gulkana River valleys, peaks of the Wrangell Mountains rise in the east to 16,000 feet. The pass through the Alaska Range, Isabel Pass, divides the Gulkana and Delta River drainages and is 3,000 feet above sea level. Nearby peaks rise to 13,000 feet. The trail then crosses into the Tanana River valley where elevations are much lower, with Fairbanks being about 350 feet. These two mountain ranges along with the two lower valleys form the dominant topographic features along the trail. Both mountain ranges trend east-west while bending in a slightly northerly arc. The rivers and valleys differ, however, with the Gulkana and Copper Rivers flowing south and the Tanana River flowing west-northwest.

Vegetation over the region varies greatly due to topography and the absence or presence of permafrost. The coastal western hemlock-Sitka spruce forest is found up to the 2,000-foot elevation along the coast. Trees common to the area include Sitka spruce, mountain and western hemlock, birch, balsam poplar, and cottonwood. Bottomland spruce-poplar forest is found along the more level flood plains, low river terraces, and more deeply thawed south-facing slopes along the Copper, Tanana, and other major rivers. Characteristic of the vegetation are white spruce, balsam poplar trees, and such shrubs as alder, willow, cottonwood, and high-bush cranberry. The upland spruce-hardwood forest is found generally on the higher portions of the interior valleys. Characteristic trees are white spruce, balsam poplar, cottonwood, birch, aspen, and black spruce. Shrubs include alder, willow, rose, low-bush cranberry, high-bush cranberry, raspberry, and currant. The lowland spruce-hardwood forest is found on areas of shallow peat, glacial deposits, outwash plains, and northerly slopes. Extensive stands of this forest type with its black spruce, white spruce (minor amount), birch, aspen, and balsam poplar trees, are found in the upper Copper River valley and in the Tanana lowlands.

The high brush vegetative system occurs between timberline and alpine tundra in avalanche paths, flood plains, and on old forest burns. A Associated with this system are aspen, birch, and white spruce trees and such shrubs as alder, devil's club, willow, and various berries. The low brush bog and muskeg vegetative system is found in wet, flat basins where tree growth is limited, such as old river terraces, outwashes, and old sloughs. Black spruce and tamarack trees, shrubs such as Labrador tea, willow, resin birch, dwarf Arctic birch, and various berries are common vegetation.

Two types of tundra vegetation are found along the trail. Moist tundra occurs in the Copper River lowland and Gulkana upland and in the rolling



Down the old trail and new highway route from Thompson Pass, north of Valdez.
(Bureau of Outdoor Recreation)

foothills on the northern side of the Alaska Range at 2,000- to 4,000-foot elevations. Various shrubs, grasses, and herbs make up this vegetative system.

Alpine tundra is typically found on mountains, including barren rock and rubble areas, alluvial fans, and drier river terraces. It occurs in the Alaska Range and Chugach Mountains. Vegetation in the system includes shrubs such as resin birch, Labrador tea, mountain heather, rhododendron, and berries; also herbs such as avens and moss-campion; and grasses, mosses, lichens, and sedges.

Large game animals are common throughout the trail area. Grizzly bear, black bear, wolves, wolverine, barren ground caribou, bison, moose, and Dall sheep are present in varying populations. Small mammals found are lynx, fox, otter, mink, marten, beaver, muskrat, and snowshoe hare. Important waterfowl nesting areas are located along the Tanana River and Copper River deltas. Raptors found are bald eagles, peregrine falcons, ospreys, goshawks, and several owl and other hawk species.

Land Uses and Access

Permanent settlements along the trail include Valdez, Copper Center, Glennallen, Gulkana, Gakona, Donnelly, Delta Junction, North Pole, Fairbanks, and College. Fairbanks, with the largest population and most development, is the service center for interior Alaska. Most of the lands along the trail are relatively uninhabited. Three military bases are located along the trail--Fort Wainwright (Army) and Eielson (Air Force) near Fairbanks, and Fort Greely (Army) near Delta Junction.

Overlying or closely paralleling the trail is the Richardson Highway, a major paved road. It starts at Valdez and goes north to join the Alcan Highway, another major road, at Delta Junction. The trail originally was to be the main route from southcentral (coastal) Alaska into the interior for communication and other services. It developed from a trail, to a sled/wagon route, to a major highway over a period of 25 years. The Richardson Highway remains today a major north-south route through Alaska. Through the past half century, the highway has typically undergone some realignment, but still follows most of the original Valdez-Fairbanks Trail. The trail length from Valdez to Thompson Pass is the only major portion where the original main trail parallels the highway rather than being overlain or crisscrossed by the highway. The Bernard Creek Trail (connecting trail) is almost as long as the Valdez to Thompson Pass section and is not overlain by a highway.

The Alcan Highway, built during World War II, serves as the only land access to Alaska from the contiguous United States. It is paved in Alaska and graveled through Canada. From Delta Junction to Fairbanks, the Alcan Highway follows the trail. Both the Richardson and Alcan Highways are heavily used for commercial transport, access between Alaskan towns, and driving for pleasure.

Another major land use is the trans-Alaska oil pipeline which passes through a corridor generally following the trail route. The pipeline corridor goes from the north slope of Alaska through Fairbanks to the south side of Valdez Arm across from the town of Valdez. This corridor varies in width but lies in the general trail area along the entire Valdez-Fairbanks Trail.

The areas considered better for settlements and intensive development along the north half of the trail exist near the highway system on level terraces with suitable soils. Along the south half of the trail, only limited areas are considered suitable for intensive development, mostly in the Copper River valley and along some of its tributaries.

General Land Ownership

Much of the land surrounding Fairbanks and down through the Tanana valley and continuing up to the approximate summit of the Alaska Range is State patented or State selection lands. The exceptions are the limited private lands mainly at Fairbanks, military withdrawn areas, and Native withdrawals in the upper Tanana valley which are mostly outside the trail area, and the utility and transportation corridor south from approximately Delta Junction.

The area from the Alaska Range summit south to the vicinity of Gulkana is mostly Native withdrawal and utility and transportation corridor withdrawal lands. State selection lands and Native withdrawal lands comprise most of the area from Gulkana to just south of Copper Center. Native withdrawal lands, State selection lands (around Valdez), and utility and transportation corridor lands lie between Copper Center and Valdez.

Native land selections continue, and all State land selections are to be made by 1985.

The Valdez to Fairbanks Trail was part of the territorial system of roads and trails, constructed and/or maintained by the Alaska Road Commission using Federal and/or territorial monies. The State of Alaska maintains that a right-of-way still exists in the name of the State along all such roads and trails pursuant to revised Statute 2477 passed by Congress in 1866.

Period and Type of Use

Early explorations by the military were made in the Prince William Sound area and up into the Copper River valley and elsewhere in Alaska in the 1800's. The expressed purpose of these ventures was to gather any and all types of information about the land and people, particularly in the interior areas, since very little information existed.

The discovery of gold in the 1890's, first in the Klondike region of Canada and then in the Fairbanks-Circle-Eagle-Tanana Valley areas and the Copper River area, caused worldwide interest in Alaska and northwestern Canada. The first gold-seekers made their way across the Coastal Mountains via the Dalton Trail, White Pass Trail, and Chilkoot Trail in southeastern Alaska to the Klondike gold fields or traveled by boat up the Yukon River. As further gold discoveries were made elsewhere in Alaska and as increasing numbers of people headed north from Seattle--their minds filled with stories of great riches, giant nuggets, and tons of gold--new routes were sought.

Due to the early military explorations in the area of Prince William Sound, prospectors began leaving Seattle via boats to the Valdez area with the plan of crossing the Chugach Mountain Range to the interior gold fields. False information from unknown sources, probably inspired and expanded upon by gold fevered men in Seattle and based on wild guesses and little fact, was spread about a trail over Valdez Glacier to the interior. The town of Valdez came into being when these prospectors first landed near the future Fort Liscum site in November 1897 and founded Valdez. An estimated 3,500 people landed at Valdez and attempted to cross the Valdez Glacier during the winter of 1897-98. Of this number, only about 260 successfully crossed the glacier and made it to the gold fields. So many died on the trail during that winter that it became known as the Death Trail of '98.

The Valdez Glacier Trail ran from Valdez northeast up and across Valdez Glacier, down Klutina Glacier to Klutina Lake, down the lake, then down the Klutina River through 25 miles of rapids to its confluence with the Copper River. The town of Copper Center was established at the confluence. Valdez Glacier was not the only dangerous trail section; a 25-mile long rapids on the Klutina also took its toll of adventurers. Many prospectors built boats at Klutina Lake and attempted to float to Copper Center. The rapids are reported to have claimed nine of every ten boats. On June 1, 1898, 36 wrecked boats were counted. Many prospectors, upon hearing about these rapids, either lined their boats down or gave up on going to the gold fields. However, in 1898, a trail was established along the Klutina River section which provided an alternative to running the rapids.

After traversing a difficult and dangerous trail and spending a summer and fall working hard in the search for gold, another hardship befell the prospectors in the Copper River valley--scurvy. During the winter of 1898-99, many died of this disease.

Captain Abercrombie, an earlier explorer of Valdez and the Copper River valley, returned to Valdez in the spring of 1899. He had previously searched for an all-American route into the interior from Valdez. His orders, General Order 51 dated March 20, 1899, directed an expedition to proceed to Valdez and from there open a military road to Copper Center. When Captain Abercrombie arrived at Valdez on April 21, 1899, he found over 80 destitute prospectors under the care of Quartermaster Charles Brown, many ill with scurvy. The captain organized a relief station and ended up extending aid to over 500 prospectors.

Captain Abercrombie's crews then set out to build the road to Copper Center. Working hard through the summer and early fall of 1899, they built a rough pack horse trail from Valdez some 93 miles to Willow Creek on the Copper River. Willow Creek was just a few miles south of Copper Center. This rough trail was the forerunner of the Valdez-Fairbanks Trail. The general path of the road ran from the military reservation at Valdez (construction of Fort Liscum started in the spring of 1900), up the Lowe River valley, through Keystone Canyon and Thompson Pass to the Tonsina Valley.

The expedition also reported that it was feasible to construct a railroad from Valdez to the Interior via Keystone Canyon and Thompson Pass. In the early 1900's, a syndicate headed by Morgan-Guggenheim interests searched for a rail route from their Kennicott Copper Mines in the area of the Chitina River, a tributary of the Copper River, to the coast. Surveys were made of the Thompson Pass/Valdez route, but the plan was abandoned in 1906 when the Copper River route was selected. In 1907, other promoters of the Keystone Canyon railway route ended their plans in violent disagreements. A steam locomotive and rails were shipped to Valdez, a line was partially built, as was a tunnel, but a railroad was never constructed over Thompson Pass.

Work continued on the Fort Liscum to Fort Egbert (Eagle) Trail in 1900. The trail was called the Trans-Alaska Military Road, by the military. Congress passed a bill in 1901 appropriating $100,000 for military roads and bridges in Alaska to be expended under the administration of the War Department. Practically all of these funds were spent by Captain Abercrombie on the Fort Liscum to Fort Egbert route which soon became known as the All-American Route to the Klondike and Yukon gold fields. The rough trail was completed between Fort Egbert (Eagle) and Fort Liscum. About 1906, the main trail was diverted at Gulkana (mile 128) by the Road Commission and directed toward Fairbanks. All future trail improvements and developments were made on the new alignment. The reason for this was the dwindling importance of Eagle and growing importance of Fairbanks on the Tanana River as a service area for the Yukon gold fields.

In 1904, Congress appropriated $25,000 more for surveys and development of the trail into a wagon road. In 1905, Congress supplemented that amount with another $5,700.

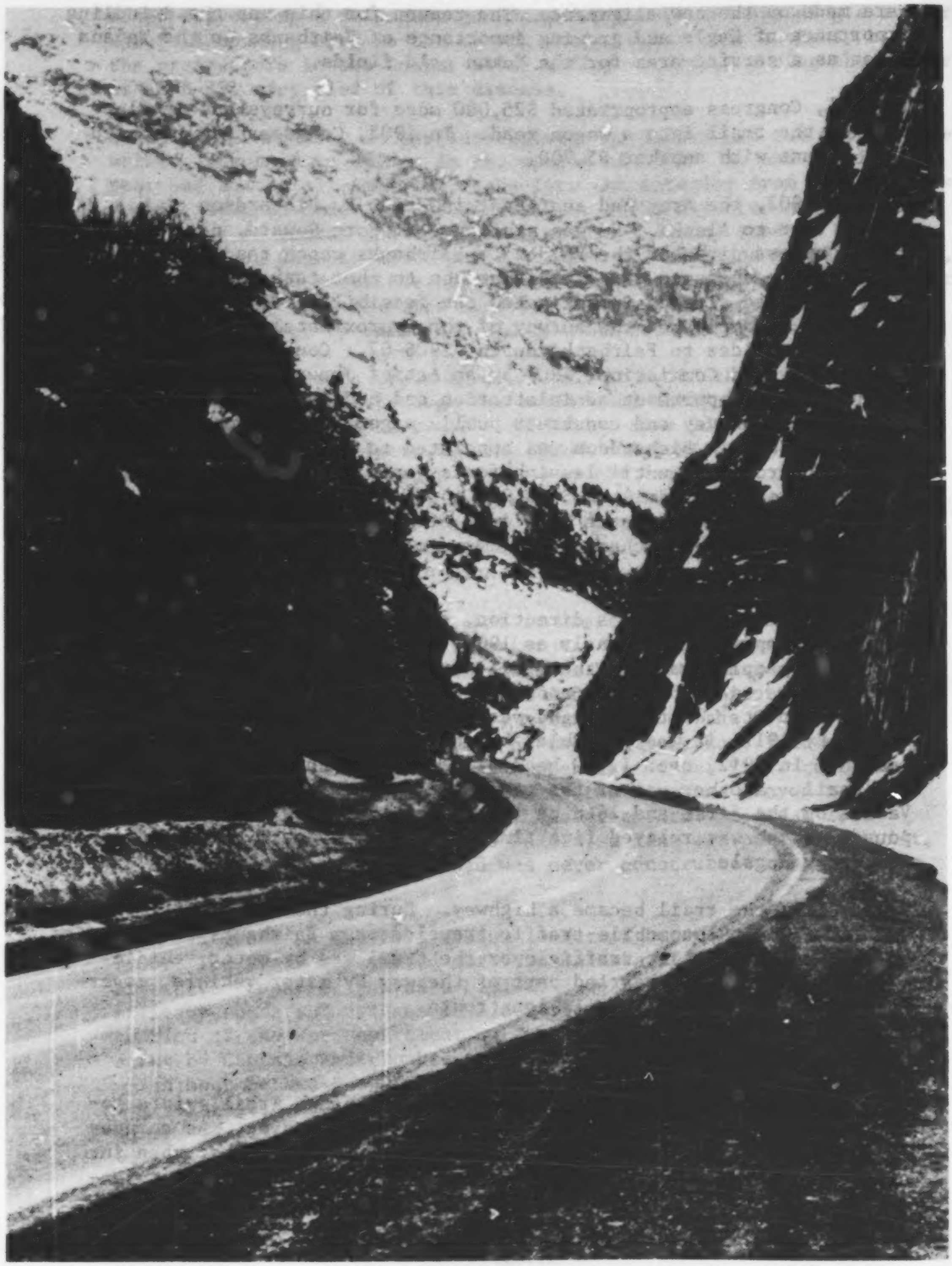
Back in 1902, the Army had sent Captain Wilds P. Richardson on his second tour to Alaska. He was stationed at Fort Seward, near Haines. When Congress directed the Valdez to Fairbanks wagon road survey, the military assigned Captain Richardson to that task, although Major John Mills had already investigated the feasibility of the route in 1905. He accomplished the survey of the approximately 365-mile long route from Valdez to Fairbanks during 1906-07. Congress then created the Alaska Road Commission (ARC) by an Act of January 27, 1905. ARC was under War Department administration and had Congressional authority and funds to survey and construct public wagon roads, trails, and bridges. Captain Richardson was appointed to head the Commission and stayed on from 1905 until leaving for a World War I assignment. In 1906, Congress appropriated $150,000 to begin work on the Valdez-Fairbanks wagon route. A later president of ARC, General James Steese, named the route the Richardson Highway in honor of the man who directed its construction.

Under Captain Richardson's direction, the Valdez-Fairbanks Trail was gradually improved. As early as 1906, at least 1,200 tons of freight and 2,000 people traveled the trail during the winter. In 1910, 3,500 people used the trail and over 2,400 tons of freight were hauled over it. Winter freight was handled by horse-drawn double bobsled. By 1911, it was passable for wheeled vehicles over its entire length. In 1912, over 1,700 head of cattle and sheep were driven over the trail. Another use of the trail was to move the mail. Mail left Valdez on the first and 16th of the month. The usual amount was 200 pounds, which was relayed five times in summer by pack horse and in winter by dogsled.

Eventually, the trail became a highway. During the summer of 1913, the first light automobile traffic traveled from Fairbanks to Valdez. After that event, most traffic over the trail was by motor vehicle. Winter mail was also carried part of the way by motor vehicle, covering 161 miles of the 365-mile long route.

Historic Trail Remnants

Little evidence of the original Valdez to Fairbanks Trail exists today except in the Lowe River valley and Keystone Canyon. As changes in the trail were made, turning it first into a wagon road, then into a motor vehicle route, and finally into a modern highway, major sections of the trail were obliterated. The Richardson Highway now



The present Richardson Highway through Keystone Canyon, north of Valdez, follows the old route. (Bureau of Outdoor Recreation) traverses much of the original route. However, because of terrain problems in the Lowe River valley and Keystone Canyon, realignments were made as the route was upgraded with the result that portions of the original trail remain intact.

Tools, implements, and equipment hauled over the old trail undoubtedly were lost or abandoned over the years. Such articles dating back to the 1890's and perhaps 1880's may still be present along the trail because of the relatively slow rate of oxidation and decomposition due to low precipitation and low mean annual temperatures along some trail sections.

Related Historic Sites

There are seven existing roadhouses located along the trail. These are Sourdough, Tazlina, Paxson, McCreary's, Poplar Grove, and Big Delta Roadhouses, and Black Rapids' Hunting Lodge. Sourdough Roadhouse is the only one still being used as a roadhouse and has been entered on the National Register of Historic Places. Approximately 56 historic roadhouses were reported to have been built and used along the Valdez to Fairbanks Trail. These are listed in the publication "Alaska's Historic Roadhouses" by Alaska Division of Parks (October 1974). Buildings associated with old Fort Liscum at Valdez still existed in 1974 but were removed when pipeline facilities were constructed at the site. A visitor center is planned at the site to cover the history of Fort Liscum. Remains of buildings and clay fireplaces stand at the abandoned settlement of Black Rapids.

The early towns along the trail still in existence include Valdez, Copper Center, and Fairbanks. Old Valdez was relocated to its present site, a short distance away, after the earthquake of March 1964. Due to the trans-Alaska oil pipeline location, the towns of Valdez and Fairbanks are in a boom situation.

Historical Significance

By comparison with the Yukon, Klondike, and other gold mining areas, the Copper River valley was not a major gold producer, nor did it attract as many people as the other areas. By 1970, the Copper River district had produced over 300,000 ounces of placer gold valued at more than $7.5 million, in comparison with the Fairbanks district which had produced just over 7,900,000 ounces valued at $250,300,000. However, other minerals, such as copper, proved to be an attraction only slightly less important.

Trail use to the various gold fields was light in relation to other trails of the period. Whereas over 22,000 people were reported to have crossed over the Chilkoot Pass Trail in 1897-98, only about 3,500 traveled over the Valdez Glacier Trail, and only a handful knew and used the route across Thompson Pass prior to 1897-98.

Although gold was the initial pulling force, the existence and importance of the Valdez-Fairbanks Trail continued because it was the route located entirely within Alaska. It started as a military trail to serve in protecting and establishing law and order and to aid in the passage of supplies and mail to the prospectors in the interior. It quickly became a public use route. As Alaska's population grew and other things drew people to Alaska, the trail was developed to serve Alaskans as the major multi-purpose road to the interior.

PRESENT AND PROSPECTIVE TRAIL USES

Present Trail Condition

Neither the main Valdez-Fairbanks Trail nor the winter alternate routes between the Little Delta and Delta Rivers or the Valdez Glacier Trail are currently being maintained as trails. Use of the main trail is obviously limited to motor vehicle use because the Richardson Highway covers most of the old trail. The only exception is in parts of the Lowe River valley and Keystone Canyon where the highway was not built over the trail. The Valdez Glacier Trail remains much as it was in the past. Since most of this trail crossed glaciers and waterways and is in an area not intensively used, little has changed its character. The Bernard Creek Trail receives some recreation use, while remaining essentially as it was during the Gold Rush period.

Scenic and Recreational Qualities

The Valdez-Fairbanks Trail offers a wide range of scenic vistas. Valdez, fronting on an arm of Prince William Sound and surrounded on other sides by the Chugach Mountains, is an area of spectacular beauty. Many of the rivers along the route, most notably the Lowe, Gulkana, and Delta, have high value.

Keystone Canyon, Thompson Pass, and Isabel Pass add further variety. The Alaska Range includes even more rugged peaks than the Chugach Range, including many of the highest mountains in North America. On the other hand, the Tanana River valley and parts of the Copper River valley lack distinctive visual appeal.

Most of the broad region extending between Valdez and Fairbanks has retained a wilderness character. The exceptions are along the route itself because of the Richardson Highway, the several towns strung out along the highway, and the trans-Alaska oil pipeline. Opportunities for recreating and viewing animals and plant communities in a natural setting are good.

Recreational Uses

The most significant recreation uses occurring along the route of the historic trail are driving for pleasure and sightseeing. Many nontrail-related recreation opportunities also are being enjoyed in the general area. State and/or Federal campgrounds are located near Gakona, Paxson, and Valdez. Fishing is good to excellent in the Gulkana, Delta, and Klutina Rivers and the tributaries to the Copper River, as well as nearby lakes. The Gulkana, Delta, and Copper Rivers offer recreational boating. Snowmobiling, cross-country skiing, hiking, and snowshoeing can be enjoyed along various sections of the trail area. Sport hunting, as well as subsistence hunting, and trapping occur throughout the trail area. The State of Alaska's Division of Parks has plans for a large state park within Keystone Canyon.

Nonrecreational Uses

The most significant, nonrecreation use of the trail route is the Richardson Highway. Another nonrecreation use of the trail area is the trans-Alaska oil pipeline. Future selections of public domain lands by Natives and the State could result in additional nonrecreation land use along the route.

CONCLUSIONS AND RECOMMENDATIONS

Qualification for National Scenic Trail Designation

The criteria used in evaluating the Valdez to Fairbanks Trail were as follows:

Criterion: Because of their special characteristics, National Scenic Trails should be nationally significant and be capable of attracting visitors from throughout the United States.

Finding: The overland trail from Valdez to Fairbanks and its surrounding gold fields and to the Copper River gold fields was traveled very lightly, even during the boom years. The Copper River district was quite modest in terms of numbers of stampeders, miners, and amount of production in comparison to other gold districts in Alaska, particularly the Fairbanks district. The high scenic values along portions of the route are of national significance and capable of attracting visitors from throughout the United States.

Criterion: National Scenic Trails are designated for hiking and other compatible uses. The National Trails System Act prohibits the use of motorized equipment on these trails except in certain circumstances.

Finding: The existence of the Richardson Highway over much of the historic trail route is a fact of life. Being a highway, motorized equipment is used on it. The development nearby of the oil pipeline is also incompatible with national scenic trail designation.

Criterion: National Scenic Trails of historical importance should adhere as accurately as possible to their principal historic routes.

Finding: The historic route of the Valdez to Fairbanks Trail is locatable and could be adhered to even though much of the route has been overlain by the Richardson Highway.

Criterion: National Scenic Trails should be provided with adequate public access through connecting local or regional trails. Access should be located at reasonable intervals to provide for trips of various lengths.

Finding: Due to the Richardson Highway, access is readily available along almost the entire route.

Criterion: National Scenic Trails should be primarily land based.

Finding: The route from Valdez to Fairbanks is land based.

Criterion: National Scenic Trails should be of sufficient length to encompass and provide appropriate access to the resources which are a basis for the trails designation.

Finding: The main historic trail was approximately 365 miles long. Secondary routes add an additional 135 miles.

Criterion: National Scenic Trails should be continuous except where no practicable or feasible interconnection exists.

Finding: A continuous trail following the historic route is not possible because the Richardson Highway has been superimposed over most of the distance.

Conclusions

Because the trail is overlain for the most part by a major highway, is paralleled by an oil pipeline, and does not have high potential for development as a hiking or similar use trail, its designation as a National Scenic Trail is not warranted. The trail was not as important as other routes during the Gold Rush Era.

Recommendations

It is recommended that no further consideration be given to the Valdez to Fairbanks route as a potential National Historic or National Scenic Trail. However, the various Federal and State agencies should continue to plan and develop, as needed, appropriate areas adjacent to the trail route, including trails from the Richardson Highway which would follow short segments of the historic route where possible, particularly in the Lowe River Valley, Keystone Canyon, and Bernard Creek Trail areas. These segments may qualify for designation as National Recreation Trails. Interpretation of the historic trail through the use of roadside markers along the Richardson Highway should also be considered.

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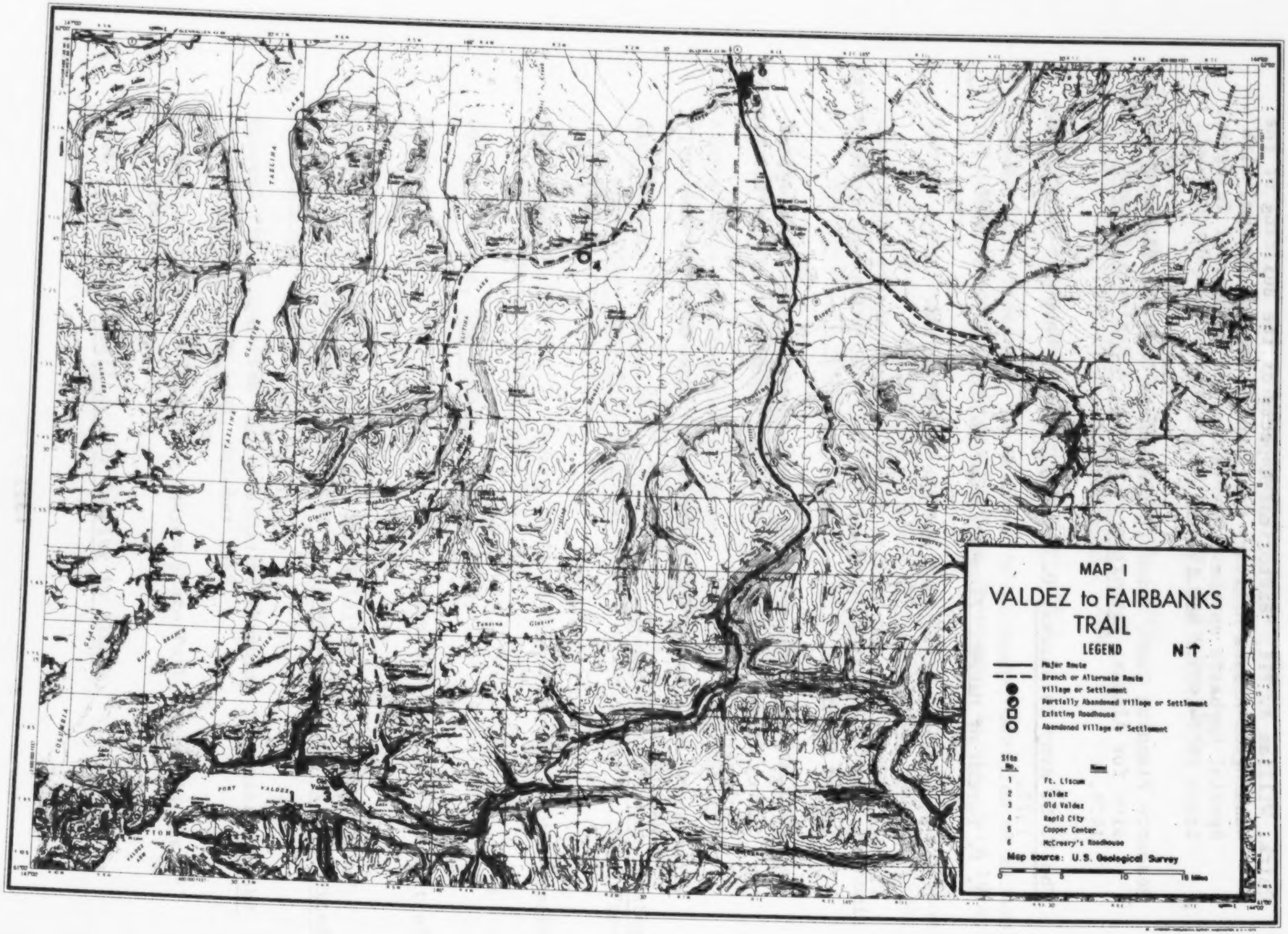
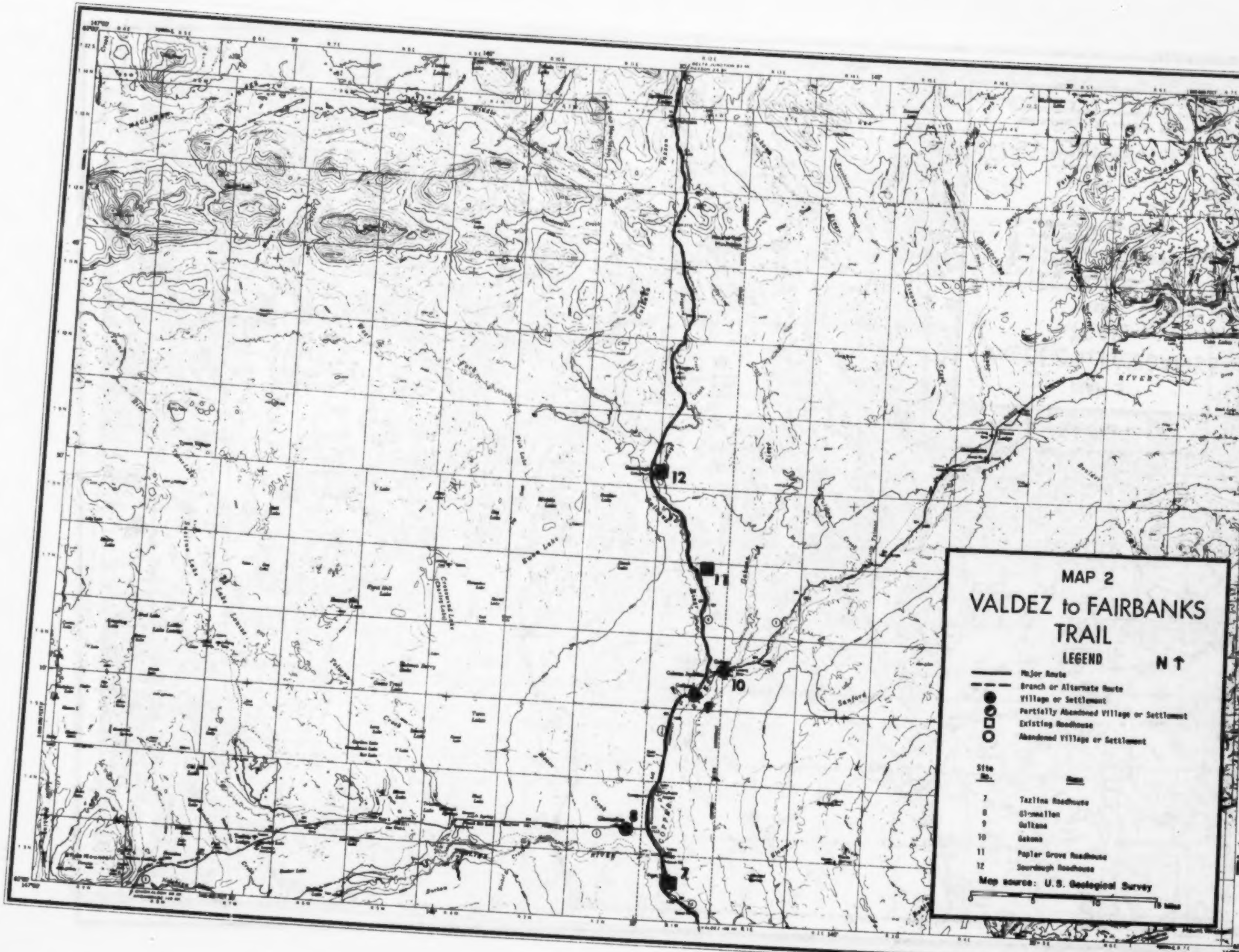


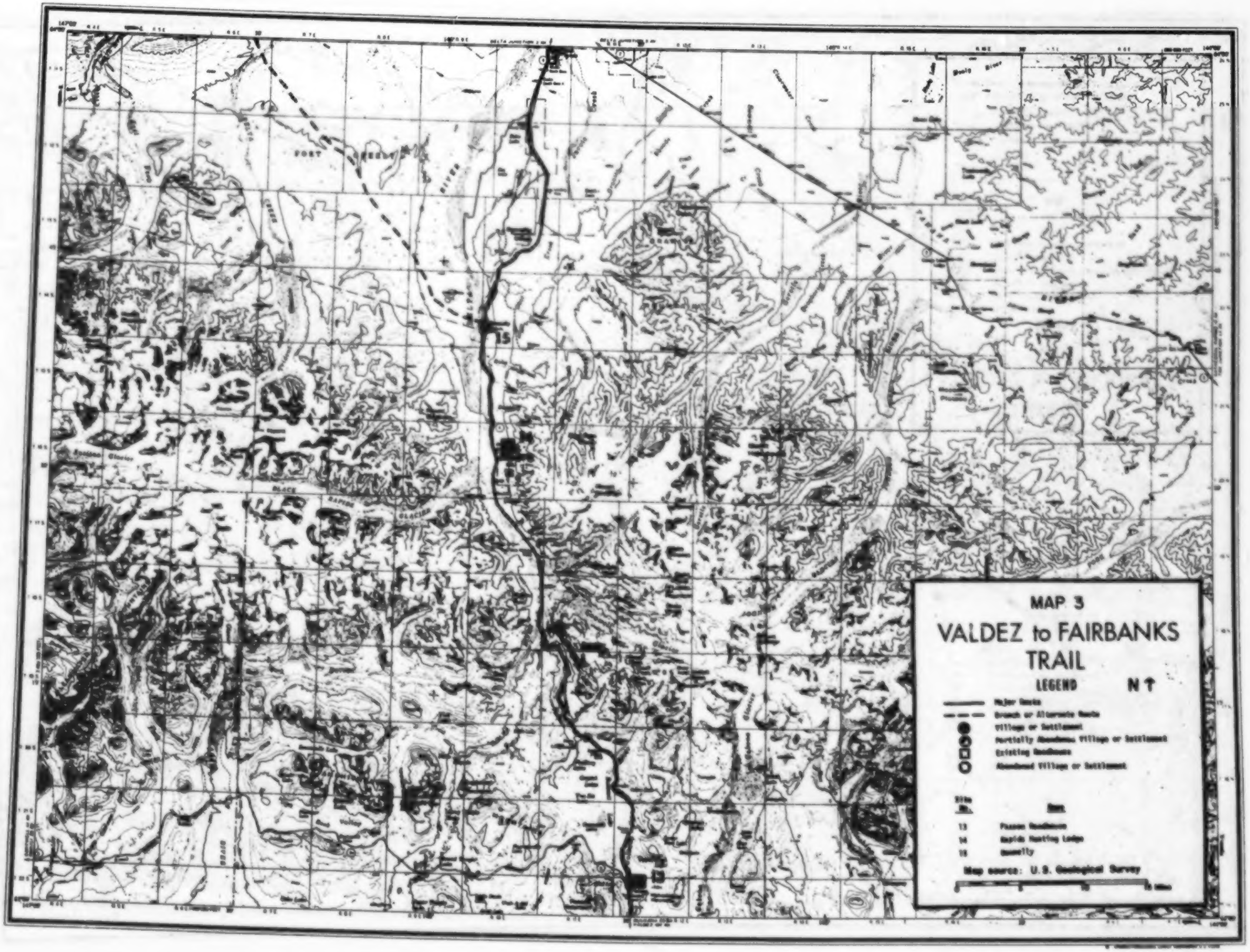
MAP I

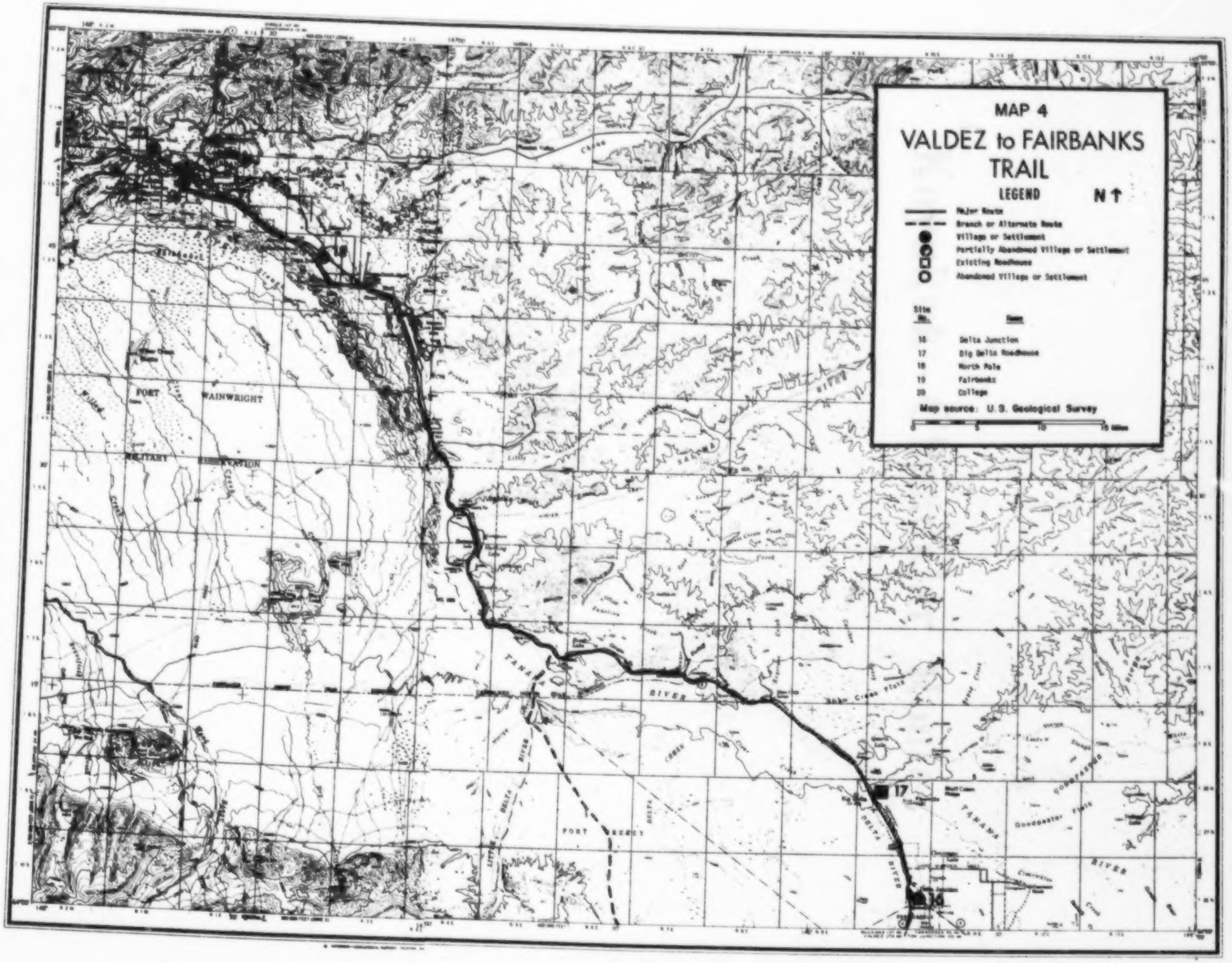
VALDEZ to FAIRBANKS TRAIL

LEGEND
N ↑
Major Route
Branch or Alternate Route
Village or Settlement
Partially Abandoned Village or Settlement
Existing Roadhouse
Abandoned Village or Settlement
Site No.
Name
1 Ft. Liscum
2 Valdez
3 Old Valdez
4 Rapid City
5 Copper Center
6 McCreary's Roadhouse
0
5
10
15 Miles
PORT VALDEZ
TAZLINA
LAKE
GLACIER
Tazlina Glacier
COLUMBIA

Map source: U.S. Geological Survey


MAP 2
VALDEZ to FAIRBANKS TRAIL
LEGEND
N ↑
Major Route
Branch or Alternate Route
● Village or Settlement
Partially Abandoned Village or Settlement
□ Existing Roadhouse
○ Abandoned Village or Settlement
Site No.
Name
7 Tazlina Roadhouse
8 Glennallen
9 Gulkana
10 Gakona
11 Poplar Grove Roadhouse
12 Sourdough Roadhouse
Map source: U.S. Geological Survey
0
5
10
15 Miles
7
8
10
11
12
Sanford
RIVER
Copper
Crosswind Lake
Fish Lake


MAP 3
VALDEZ to FAIRBANKS TRAIL
LEGEND
N ↑
Major Route
Branch or Alternate Route
Village or Settlement
Partially Abandoned Village or Settlement
Existing Roadhouse
Abandoned Village or Settlement
Site No.
Name
13 Paxson Roadhouse
14 Rapids Hunting Lodge
15 Donnelly
Map source: U.S. Geological Survey
0
5
10
15 Miles
DELTA JUNCTION
15
BLACK RAPIDS GLACIER
FORT GREELY


MAP 4
VALDEZ to FAIRBANKS
TRAIL
LEGEND
N ↑
Major Route
Branch or Alternate Route
Village or Settlement
Partially Abandoned Village or Settlement
Existing Roadhouse
Abandoned Village or Settlement
Site No.
Name
16 Delta Junction
17 Big Delta Roadhouse
18 North Pole
19 Fairbanks
20 College
Map source: U.S. Geological Survey
0
5
10
15 Miles
FORT WAINWRIGHT
MILITARY RESERVATION
TANANA RIVER
DELTA RIVER
FORT GREELY
LITTLE DELTA RIVER
17
16

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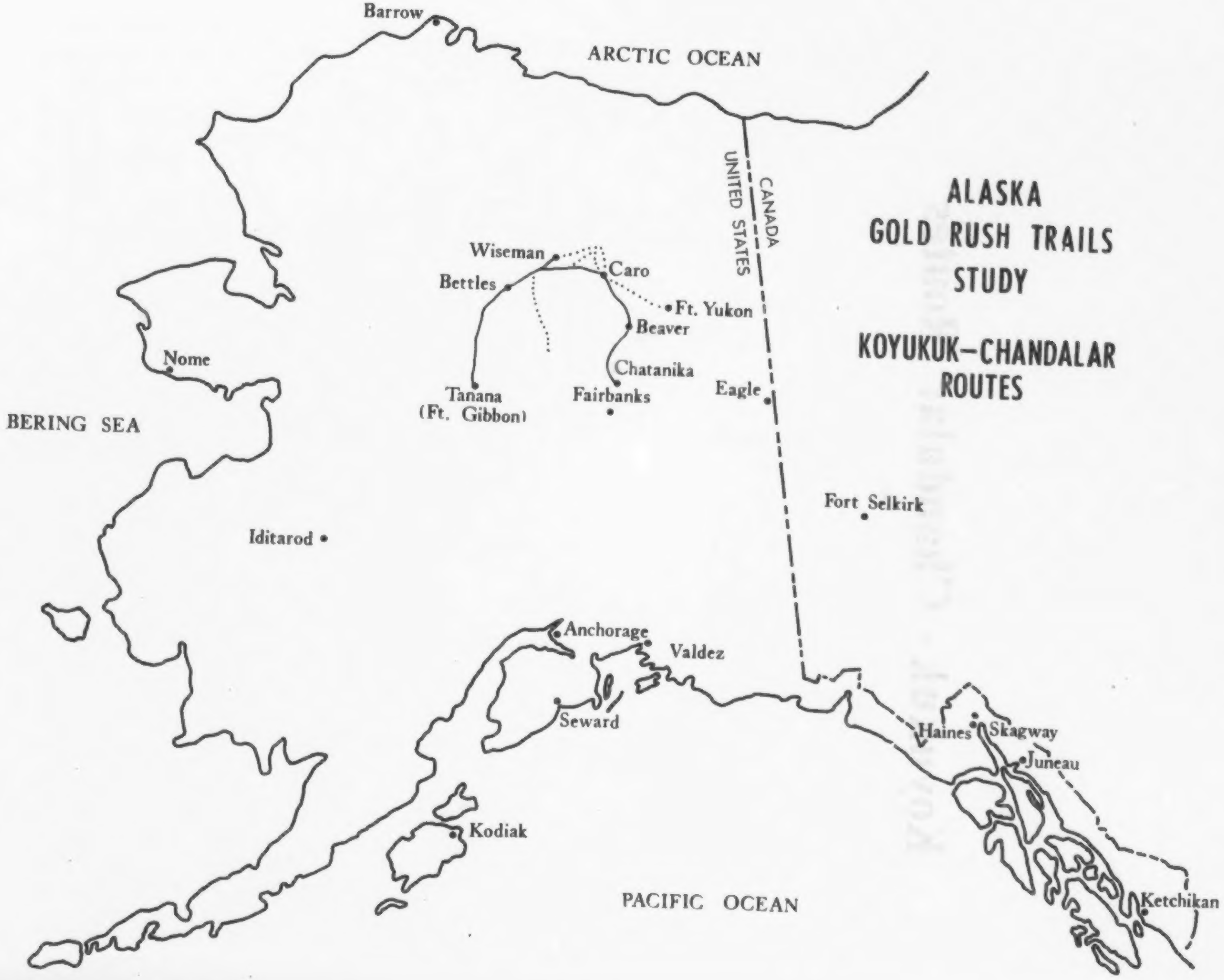
Koyukuk - Chandalar Routes



ALASKA
GOLD RUSH TRAILS
STUDY

KOYUKUK–CHANDALAR
ROUTES

Barrow
ARCTIC OCEAN
CANADA
UNITED STATES
Wiseman
Caro
Bettles
Ft. Yukon
Beaver
Nome
Chatanika
Tanana
(Ft. Gibbon)
Fairbanks
Eagle
BERING SEA
Fort Selkirk
Iditarod
Anchorage
Valdez
Seward
Haines
Skagway
Juneau
Kodiak
PACIFIC OCEAN
Ketchikan

KOYUKUK - CHANDALAR ROUTES

BACKGROUND

Lieutenant Henry T. Allen of the U. S. Army conducted the first official exploration in the upper Koyukuk River drainage. In 1885, he crossed overland from the Yukon River along the divide between the Tozitna and Melozitna Rivers, down the Kanuti River, and then up the Koyukuk River as far north as the John River confluence. That same year, Lt. Cantwell of the U. S. Revenue Marine Service traveled up the Koyukuk by steamer, then took skin boats up the Alatna River and portaged over into the Kobuk River drainage.

John Bremner, who had accompanied Allen on his expedition through Alaska, and a partner, Peter (or Peder) Johnson, were the first known prospectors in the upper Koyukuk in 1887. Although not documented, some people believe they found gold at Tramway Bar on the Middle Fork during that year. However, it was not until 1893 that the first paying gold was reported to be taken at Tramway Bar.

Between 1887 and 1897, only 18 to 20 prospectors were reported in the upper Koyukuk region. During that time, small amounts of gold were taken out of the Tramway Bar area and in the South Fork drainage.

With the Klondike Gold Rush in 1898, over 1,000 persons are reported to have taken steamers up the Koyukuk in search of gold in the upper drainage. Most were soon discouraged by the absence of bonanzas and by the remote, inhospitable country; and, according to Robert Marshall, author of Arctic Village, only 200 persons wintered over in the upper Koyukuk that year (Schrader reports 500 to 600) in the new towns of Arctic City, Bergman, Peavy, and camps along the South Fork.

When travel permitted in the spring of 1899, more left the Koyukuk district. Those who stayed were the more seasoned prospectors and their persistence quickly paid off when new strikes were made later that year on Slate Creek and Myrtle Creek, tributaries of the Middle Fork. Two new towns were founded: Slate Creek at that creek's confluence with the Middle Fork, and Bettles located just below the John River confluence.

In 1900, Bettles largely replaced the downstream town of Bergman as the major supply point for the upriver placer mines. The town of Slate Creek became known as Coldfoot, named after a cheechako, or newcomer, who upon reaching the Slate Creek diggings got cold feet and turned back.

Over the next few years, several hundred miners worked the placers of the Coldfoot area and in the North Fork and South Fork drainages of the Koyukuk. In 1906, a gold strike was made in the Chandalar district to the east and several hundred men, many from the upper Koyukuk, rushed to the new diggings around Chandalar Lake.

A new town of Caro was founded on the Chandalar River at Flat Creek. However, the cabins were deserted within 2 or 3 years and fewer than 50 men remained in the district when little gold was recovered.

During the winter of 1907-08, new gold discoveries were made on Nolan Creek north of Coldfoot and a reported 200 men rushed to the Koyukuk during the spring of 1908. In 1911, at about the time when the richer surface placers were nearly exhausted, deep placers were discovered in the Hammond River area. Spawned by this strike and continued activity in the Nolan Creek area, Wright's roadhouse at the confluence of Wiseman Creek and the Middle Fork grew into the town of Nolan. Mining in the Coldfoot area had declined steadily over several years and postal service was discontinued to Coldfoot in 1912. In 1923, the Nolan Post Office was officially renamed Wiseman, after the creek.

The primary mode of transportation to and from the Koyukuk district was by boat up and down the Koyukuk. However, some overland travel took place, especially in the winter months, and several trails were established. All the major overland routes began at various settlements along the Yukon River. An early route left Fort Yukon, followed the Chandalar River (originally reported as Chandlar) upriver, crossed a divide, and followed Slate Creek down to Coldfoot. Another early route left the Yukon near Fort Hamlin (downstream of Stevens Village), followed the Dall River upriver, crossed the divide to the South Fork of the Koyukuk, and then traversed the South Fork headwaters to Slate Creek and Coldfoot.

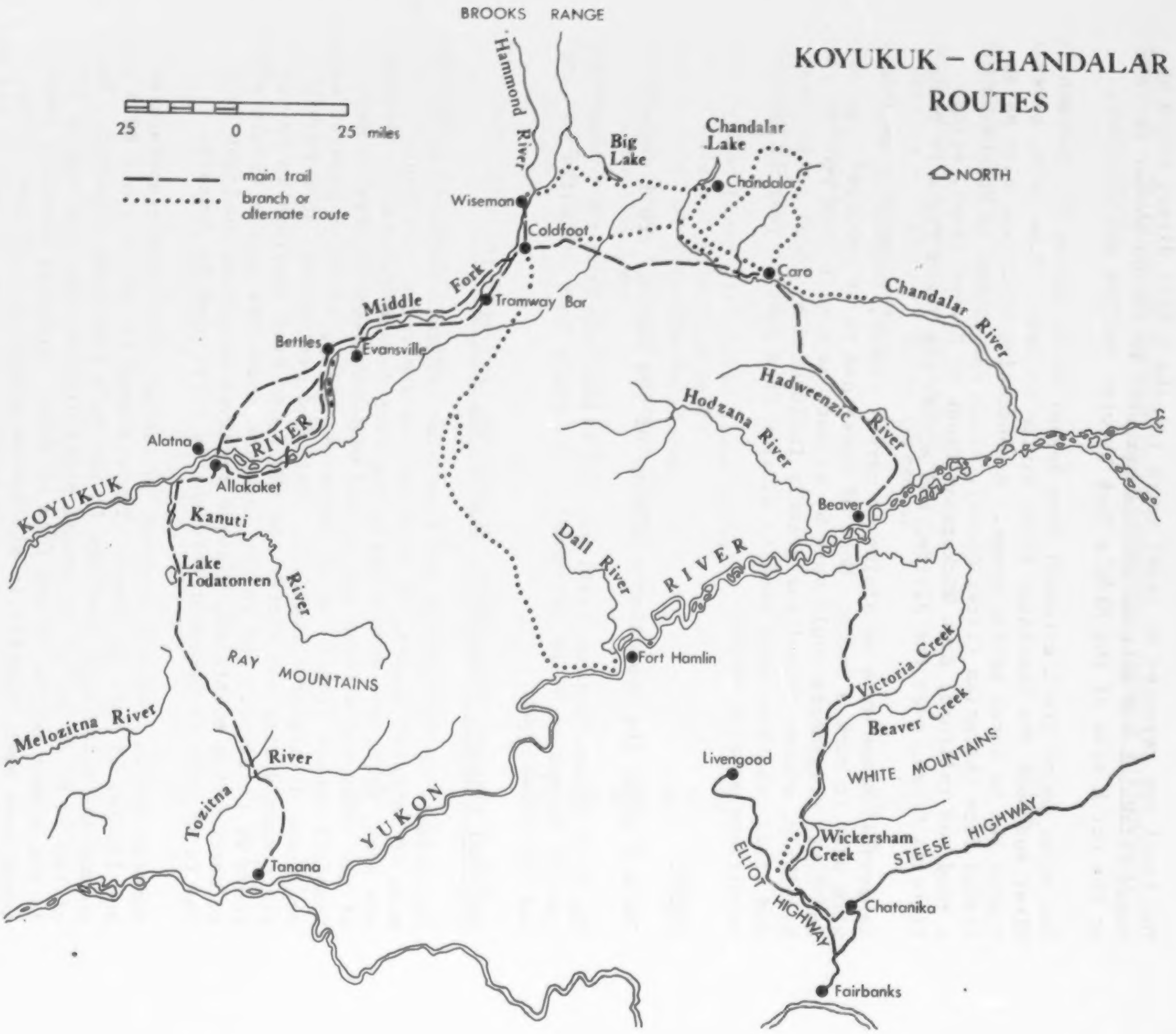
A somewhat later route established by the Alaska Road Commission (ARC) left the Yukon at Fort Gibbon at the confluence of the Tanana and went up the Tozitna River drainage, into Kanuti drainage, and then followed the Koyukuk upriver from near Allakaket to Bettles, Coldfoot, and Nolan. Another trail established by the Alaska Road Commission went north from Beaver on the Yukon to Caro on the Chandalar and then connected with local trails to mines in the Chandalar district and with the trail up the Chandalar River to the Koyukuk district. Trails also connected Fort Gibbon and Beaver with Fairbanks.

LOCATION AND REGIONAL ENVIRONMENT

General Alignment

The accompanying maps outline the known trails to the Koyukuk district or Wiseman area, and the adjacent Chandalar district.

Only two of these routes, both built by the Alaska Road Commission, can be considered major trails of the Gold Rush Era. The so-called Fort Gibbon-Koyukuk Trail left the Yukon River at Fort Gibbon, followed the Tozitna River, then its tributary Dagislakha Creek, over a divide and up the Melozitna River, past Lake Todatonten, down the Kanuti River, and up the Koyukuk to Allakaket, Bettles, Coldfoot, and Nolan (Wiseman).



KOYUKUK – CHANDALAR ROUTES

BROOKS RANGE
25 0 25 miles
main trail
branch or alternate route
NORTH
Hammond River
Big Lake
Chandalar Lake
Chandalar
Wiseman
Coldfoot
Caro
Chandalar River
Middle Fork
Tramway Bar
Bettles
Evansville
Alatna
RIVER
Allakaket
KOYUKUK
Hadweenzic River
Hodzana River
Beaver
Kanuti River
Lake Todatonten
Dall River
RIVER
Fort Hamlin
RAY MOUNTAINS
Victoria Creek
Beaver Creek
WHITE MOUNTAINS
Melozitna River
River
Tozitna
Livengood
YUKON
Wickersham Creek
ELLIOT HIGHWAY
STEESE HIGHWAY
Chatanika
Tanana
Fairbanks

The trail was rerouted at least twice to make a more direct route between Allakaket and Bettles and was rerouted to follow better terrain on the north side of the Middle Fork between Bettles and Coldfoot.

The other major trail extended from Beaver north across the Hadweenzic River and over the Chandalar River divide to Caro. From Caro, several trails led to local mining areas. A connecting trail was also established from Chatanika (later Olnes), which was linked to Fairbanks by a road and railroad, down Wickersham Creek to Beaver Creek, across Victoria Creek, over the divide, and across the Yukon Flats to Beaver.

In several areas such as alpine or marshy places, tripods or stakes were used to mark a route. Most of these had to be replaced regularly and trail alignments could vary by as much as a mile from year to year. Similarly, winter travel was greatly influenced by local conditions and trail locations were readily altered from year to year if better conditions existed nearby.

Length

Table V gives the approximate mileage of the various trail segments.

The Fort Gibbon-Koyukuk Trail was 273 miles long from the present-day town of Tanana to Nolan (Wiseman). The route from Chatanika to Caro was 195 miles long.

Regional Climate, Topography, Vegetation, and Wildlife

The climate of the Koyukuk and Chandalar regions, similar to that of much of interior Alaska, is described as subarctic continental. Winters are long, dark, and severe beginning with freeze-up in early October of the lakes and streams and ending with break-up usually in May. Snowfall ranges from 50 to 80 inches annually, although heavier amounts may occur at higher elevations. Extended periods of -40°F to -60°F are common during the winter and -80°F has been recorded in recent years at Coldfoot. Due to its location above the Arctic Circle and to surrounding mountains, Wiseman receives no direct sunlight from the first week in December through the first week in January.

Summers are in complete contrast to winters with warm temperatures and little, if any, darkness. Temperatures in the 70's and 80's are common and occasional readings in the 90's have been reported. Most of the 10 to 20 inches of annual precipitation over the region falls in the summer months in the form of rain. Although freezing temperatures have been reported in all months except July in most areas, a frost-free season generally extends from the first of June to the end of August.

Permafrost, either continuous or discontinuous, underlies much of the region except along streams and on some favorable south-facing slopes.

TABLE V. Mileages of Various Trail Segments: Koyukuk - Chandalar Routes

	MILES
Major Segments	
Fort Gibbon (Tanana) - Allakeket - Bettles - Coldfoot - Nolan (Wiseman)	273
Chatanika - Beaver - Caro	195
Subtotal	468
Other Segments	
Caro - Flat Creek (to Little Squaw Creek)	45
Caro - Coldfoot (via West Fork)	85
Caro - Coldfoot (via Crooked Creek)	90
Caro - Big Creek (to Little Squaw Creek)	48
Caro - Chandalar Lake	50
Chandalar Lake - Little Squaw Creek	60
Fort Yukon - Caro	15
Fort Hamlin - Coldfoot	110
Subtotal	503
Connecting Trails and Roads	
Fairbanks - Fort Gibbon	120
Fairbanks - Chatanika (by railroad)	32
Subtotal	152
TOTAL	1,123

North of Bettles and Caro, the hills and rugged mountains of the Brooks Range dominate the landscape. Relief is great with peaks rising 2,000 to 3,000 feet above the many broad, glacially-carved valleys which lace the Range. The elevation of Caro is approximately 1,000 feet, Wiseman 1,200 feet, and Bettles (new town) about 650 feet.

The Kanuti Flats is the dominant topographic feature between Bettles and the Kanuti River. Relief is generally low with occasional hills and ridges rising 1,000 to 1,200 feet in elevation.

The Ray Mountains and associated hills to the west divide the waters flowing into the Koyukuk from those rivers flowing south directly into the Yukon, such as the Melozitna and Tozitna. These mountains and hills are much less rugged than those of the Brooks Range, having more gently sloping sides and little exposed rock surfaces. The divide crossed by the Fort Gibbon-Koyukuk Trail is approximately 1,200 feet in elevation, although nearby peaks in the Ray Mountains rise to over 3,000 feet. After dropping down into the low valley of the Tozitna River, the trail climbs to over 2,000 feet before dropping down to the present town of Tanana along the Yukon River (elevation about 200 feet).

South of Caro, the Beaver-Caro Trail climbs to over 2,400 feet in crossing the rounded low mountains which form the divide between the Chandalar River and the Hadweenzic River drainage. Nearby mountains rise to only several hundred feet above the trail. Between this divide and Beaver, relief is moderate with the trail intersecting east-west trending ridges and tributaries of the Hadweenzic.

The village of Beaver is located in an immense area known as the Yukon Flats at an elevation of 362 feet. The White Mountains separate the Yukon Flats from the Tanana River lowlands of the Fairbanks area. After crossing the Flats, the old Chatanika-Beaver Trail climbs to over 2,000 feet in crossing the Victoria and Beaver Creek drainages. The Chatanika area north of Fairbanks is characterized by high hills and ridges rising 1,000 to 2,000 feet above stream valleys.

Vegetation over the region varies greatly due to topography and the absence or presence of permafrost. Along the Koyukuk River and its upper tributaries and along the Tozitna River, a bottomland spruce-poplar forest is found. Major trees include white spruce and balsam poplar. On gently rising slopes above the river valleys, an upland spruce-hardwood forest generally exists consisting of the various tree species, but dominated by large areas of black spruce and open marsh or muskeg. Alpine and moist tundra are found in the higher divide area between the Kanuti and Tozitna drainages, just north of Tanana, and on many of the mountain slopes in the Brooks Range. Treeline generally ranges between 2,000 and 2,500 feet.

The mountain area between Wiseman and Chandalar Lake is largely vegetated with tundra and willow plants with only occasional sparse stands of white spruce. South of Chandalar Lake, the river valleys of the Chandalar River drainage are largely covered by either a bottomland spruce-poplar forest or an upland spruce-hardwood forest.

A short section of alpine tundra is crossed in the divide between the Chandalar and Hadweenzic Rivers. Heavy upland spruce-hardwood and lowland spruce-hardwood forests dominate the area north and south of Beaver with an intervening section of bottomland spruce-poplar forest along the trail route to Chatanika.

Large game animals are common throughout the region, although most populations are sparse in relation to land area because of the harsh climatic conditions and absence of available winter food. Caribou, moose, Dall sheep, black bear, brown/grizzly bear, and wolves are locally present in varying populations. Small fur-bearers including lynx, beaver, mink, land otter, weasel, marten, and muskrat are abundant over much of the region at lower elevations.

Important waterfowl nesting areas are located in the Kanuti Flats and Yukon Flats. Common raptors in the region include northern bald eagle, golden eagle, osprey, rough-legged hawk, goshawk, marsh hawk, great horned owl, great grey owl, and others. Gyrfalcons are occasionally observed in the higher regions of the Brooks Range and the endangered peregrine falcon is present in the region.

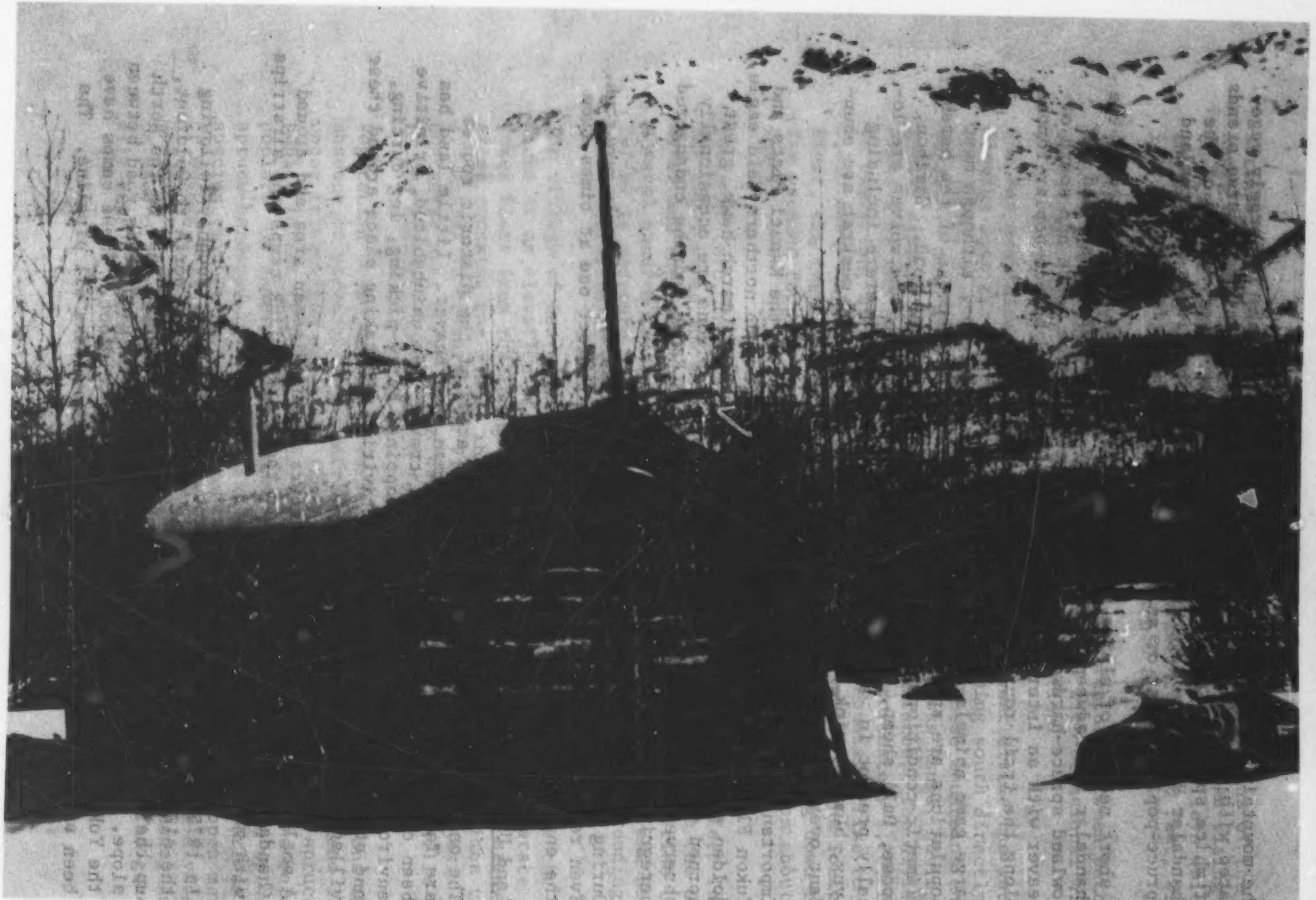
During the summer, mosquitoes and biting flies are extremely numerous. Even repellents and head nets cannot fully protect one at times from the endless attack.

Land Uses and Access

The only permanent settlements in the areas of the historic routes are Tanana, Allakaket, Bettles, Wiseman, and Beaver. Little land has been cleared and most of the routes traverse an uninhabited, primitive environment. Hunting, fishing, trapping, berry-picking, log cutting, and other subsistence-oriented activities are taking place around these villages.

A small amount of mining still occurs in the Wiseman area and around Chandalar Lake. Tractor trails in these areas link camps and airstrips with mining and prospecting areas.

In 1975, an all-weather gravel road was completed, roughly following the old Dall Creek Trail from the Fort Hamlin area north to Coldfoot, up the Middle Fork, past Wiseman, and over Dietrich Pass to the north slope. Several construction camps are located along this road between the Yukon River and Dietrich Pass, and at Coldfoot. These camps have been used in the construction of the trans-Alaska oil pipeline. The



One of several residences at Wiseman. The pipeline haul road passes at the base of the mountain in the background. (Bureau of Outdoor Recreation) road parallels the pipeline and connects with the existing Elliott Highway from Fairbanks at Livengood.

Tanana, Allakaket, Bettles, and Beaver are served by regular commercial air service and many additional airstrips for bush pilots exist in the region. The pipeline camps are also presently served by commercial air service. Charter air service is available at Bettles.

General Land Ownership

Virtually all of the land traversed by the several routes to the upper Koyukuk and Chandalar areas is currently in Federal ownership, managed by the Bureau of Land Management.

Twenty-five townships surrounding the villages of Bettles (Evansville), Allakaket, Tanana, and Beaver have been withdrawn for Native selection. Between the Native selection areas of Tanana and Allakaket, much of the route area has been classified as public interest lands under Section 17(d)(1) of ANCSA. Much of the White Mountains area is similarly classified. These (d)(1) lands are withdrawn from all forms of appropriation under the public land laws, including the mining and mineral leasing laws except for the location of metalliferous minerals.

The Middle Fork of the Koyukuk Valley has been withdrawn as a utility corridor. The Chandalar area east of the utility corridor within the Brooks Range has largely been selected by the State of Alaska and is pending receipt of patent.

Between the Chandalar River and the White Mountains, much of the route area has been withdrawn under Section 17(d)(2) of ANCSA and is proposed for inclusion in the Yukon Flats National Wildlife Refuge. These lands are withdrawn from all forms of appropriation. A similar (d)(2) corridor, 2 miles wide, has been withdrawn along Beaver Creek within the White Mountains. This river is proposed for inclusion in the National Wild and Scenic Rivers System.

In the Chatanika area and south to Fairbanks, lands have been either patented to the State or are pending transfer of patent from the Federal government.

An area of the central Brooks Range immediately adjacent to the west boundary of the utility corridor is classified under (d)(2) and has been proposed for inclusion in the Gates of the Arctic National Park. This proposed parkland encompasses lands in the North Fork of the Koyukuk drainage within about 10 miles of Wiseman.

Native land selections continue, action on proposed additions to the national conservation system are to be taken by December 1978, and all State land selections made by 1985.

The Fort Gibbon-Koyukuk Trail, the Chatanika-Beaver Trail, the Beaver-Caro Trail, and the Caro-Coldfoot Trail were part of the territorial system of roads and trails and were constructed and maintained by the Alaska Road Commission using Federal and/or territorial money. The State of Alaska maintains that a right-of-way still exists in the name of the State along all such roads and trails pursuant to revised Statute 2477 authorized by Congress in 1866.

The current Bureau of Land Management land status records show a reservation under 44LD513 (Department of the Interior land decisions) for most of the historic routes to and from the Wiseman and Chandalar area. As such, these trails would be reserved for public purposes in Federal ownership should patent be transferred.

HISTORIC RESOURCES

Period and Type of Use

Some remarks by F. C. Schrader of the U. S. Geological Survey following his visit to the Chandalar and Koyukuk districts in 1899 aptly describe travel in the region:

> The Chandler (sic) and Koyukuk River regions form no exception to the rule of Alaskan travel. The almost invariable means is by boat or canoe along the waterways in summer, and overland by trail with the use of dog sleds (sic) in winter. The term "trail" as used in Alaska, refers more particularly to the passable condition of the country than to any foot-beaten path or well-worn line of travel. This is especially true of the Chandler (sic) and Koyukuk regions.

Most of the early stampeders and subsequent movement of supplies to the Koyukuk district came up the Koyukuk River by steamer to the head of navigation at Bergman and later Bettles. From there, people and goods transferred to horse-drawn scow or pole-boat and were taken upriver to Coldfoot or Nolan (Wiseman). Supplies often were stored until winter when they were taken upriver from Bettles by horse-drawn sled or dog team.

In the early days of the Koyukuk boom, some overland summer travel took place along the Dall Creek divide route from Fort Hamlin on the Yukon to Coldfoot. However, even by 1909, Maddren of the U. S. Geological Survey described this route as poorly marked and little used. Horses and a few cows were reported taken over this route.

There was also a trail used in the early stages of gold discovery that followed the Chandalar River up from Fort Yukon to the West Fork over the divide, across the South Fork of the Koyukuk headwaters, and down Slate Creek to Coldfoot. This was reported to be used in both summer and winter. Maddren reported that winter and summer mail was carried to Coldfoot over this route from Fort Yukon prior to 1906. Because steamers reached Bettles during the summer, it is doubtful that much mail was carried up this route in summer.

In 1906, winter mail was carried north by dog team from Fort Gibbon on the Yukon to the upper Koyukuk following a route up the Tozitna River drainage, over the divide to Allakaket, and up the Koyukuk to Bettles, Coldfoot, and Nolan. Over the next several years, the Alaska Road Commission worked on the trail and finished it to winter trail standards in the winter of 1909-10. By 1917, the section between Bettles and Nolan had been upgraded to winter sled road standards. Horses as well as dogs were used to carry freight over this sled road.

Although steamers were taken up the Chandalar River, they could only ascend about 70 miles, or about 40 miles short of Caro and 75 miles from the mines. Thus, during the winter of 1909-10, work began on a trail from Beaver to Caro to better supply the Chandalar mining district. Over the next several years, a winter sled road was constructed which was also suitable for summer pack horses. By 1924, the sled road had been constructed to summer wagon road standards.

Frank Yasuda, a trader and prospector, and his partner Thomas Carter, upon hearing about the proposed ARC route, made plans for Yasuda to build a place where they thought the road would come out. Twenty-nine Mile Hill was used as a landmark. In 1910, Yasuda and his Eskimo wife, Nevelo, were living in Beaver along with James Mennano and his Eskimo wife and a third Eskimo family. During the years following the establishment of Beaver, Eskimos were employed by the Alaska Road Commission in building bridges and cabins.

Over the winters of 1911-12 and 1912-13, a winter trail was constructed from Chatanika to Beaver to link up with the Caro trail. This trail received little subsequent use or maintenance, but was brushed out and shelter cabins erected and restored again during the winter of 1923-24.

Although used by early mail carriers and miners, the Coldfoot-Caro trail did not receive any attention from the Alaska Road Commission until the winter of 1923-24 when the route was brushed out, tripods erected, and shelter cabins and river tramways erected. This improved trail was passable by dog teams in winter and by foot in summer.

Several routes and trails were established during and after 1906, between Coldfoot and the Chandalar diggings and to the mining areas from Caro. During the rush of 1906, over a hundred men were reported to have left the Koyukuk diggings to seek bonanzas on Big Creek, Little Squaw Creek, and Big Squaw Creek in the Chandalar Lake area. The route generally taken between the two districts left the old Fort Yukon-Coldfoot route near the Boulder Creek confluence with the South Fork of the Koyukuk, ran down Crooked Creek, up the Chandalar to Chandalar

Lake, and up Tobin Creek to the mining areas. Other routes were developed by the miners to and from the supply point at Caro. One route went up the Middle Fork of the Chandalar and down Grave Creek to the mines. Another followed Big Creek and over a divide into Little Squaw Creek.

The amount of use on the various trails generally corresponded to the amount of activity in the gold districts during a given year and to the physical development of a trail or sled road. The first significant rush utilizing the winter trails to the Koyukuk occurred in February and March of 1900 following the reports of major strikes on Myrtle and Slate Creeks. An estimated 200 people came up from Fort Yukon and from Fort Hamlin, overland to Coldfoot. Several hundred rushed to the Chandalar strikes in 1906. Although many came from the Koyukuk district and others came up the Chandalar by boat, others probably followed the old summer and winter trail up the Chandalar River from Fort Yukon.

Before break-up in 1908, approximately 200 prospectors again headed for the Koyukuk when news of the Nolan Creek strike came out. By this time, the trail up the Tozitna drainage was in use and many probably came north from Fort Gibbon. The Hammond River discoveries in 1911 again sparked trail activity to and from the Koyukuk.

However, in most years, mail delivery and the semi-annual migration of miners and prospectors constituted the mainstay of trail use. When the mail route was established on the Fort Gibbon-Koyukuk Trail in 1906, and Alaska Road Commission work on the trail began, that trail soon attracted additional travelers who may have otherwise taken a steamer. Similarly, the completion of the ARC trail and later sled road to Caro from Beaver soon became the primary route of overland travel to the Chandalar district and encouraged greater amounts of traffic than otherwise may have occurred with merely an unmaintained route.

Production and, hence, trail activity declined substantially after 1917 in the Koyukuk district. World War I and the attraction of many away from the gold fields in Alaska, the exhaustion of economically mined placers, and even prohibition are pointed to as reasons for this decline. Although a few persons continued to operate small placers, the Gold Rush Era was largely over in the Koyukuk by 1920.

The Chandalar district held more continued hope and less actual production than perhaps any other in Alaska. After the initial rush of 1906, fewer than 50 people ever worked the mines in a given year. The discovery of lode deposits prompted trail and sled road construction for the movement of necessary equipment, yet relatively little use was actually made of these developments. Ironically, it was not until the early 1920's, after the gold rushes, that the greatest gold production was reached. The boost in production in 1922 prompted the ARC to upgrade the existing trails and sled roads in the area. However, little further use was made of them as gold production again sagged by the close of the 1920's and the air-age came to Alaska. The Caro Post Office, established in 1907, was discontinued in 1912.

Historic Trail Remnants

Many of the historic trails in and to the Koyukuk and Chandalar areas continued to be used after the Gold Rush Era by people employing dog teams, horsedrawn wagons and sleds, tractors, ATV's (all-terrain vehicles), and snow machines. Thus, trails over many of the old routes are still very evident.

The old route from Fort Gibbon to Bettles can be followed for most of its distance. This route has been traveled since the early mining days by vehicles and a track approximately 8 to 10 feet wide is visible, especially through forested or brushy areas. The segment between Allakaket and Bettles, realigned from the original trail, is heavily used by local residents on snow machines in the winter.

Several old and modern tractor trails exist between Bettles and Wiseman, one of which probably was superimposed on the old trail and the later sled road. From Coldfoot to Wiseman, a new gravel road was built along the Middle Fork to aid construction of the trans-Alaska oil pipeline.

Most of the old trails between Coldfoot and the Chandalar area and between Caro and the mines have been traveled in recent years by caterpillar tractors and other vehicles and cleared stretches through trees and brush are in evidence. As in the case of the Koyukuk trails, most of this travel has been in the winter months and low-growing brush and tundra vegetation forms the bed of most of these trails.

The wagon road which was developed from Beaver to Caro is still visible with little obstruction to winter travel. A wide roadbed of perhaps 20 to 30 feet exists along the entire route.

The Chatanika-Beaver trail is the least altered segment of the original Koyukuk-Chandalar routes but, at the same time, the least visible. Developments in the Fairbanks area and the construction of the Steese and Elliott Highways obliterated the original trail from Chatanika to about mile 22 of the Elliott Highway. From that point, the old route has been used in recent years by snowmachiners to the Big Bend area of Beaver Creek. Beyond, the old trail can be seen only faintly in a few places as it proceeds north along Beaver Creek, up over a divide, across Victoria Creek, over another divide, and across the Yukon Flats to Beaver.

Shelter cabins were erected at intervals along those trails and sled roads constructed by the Alaska Road Commission. Several of these cabins are still standing along the Beaver-Caro wagon road and along

Old route now used by "Cats" between Beaver and Caro.
(Bureau of Outdoor Recreation)

the Chatanika-Beaver Trail. Cabins may also be present between Caro and Coldfoot and between Tanana (Fort Gibbon) and Allakaket.

Tools, implements, and equipment hauled over the old routes undoubtedly were lost or abandoned over the years. Such articles dating back to the late 1890's may still be present along the trails because of the relatively slow rate of oxidation and decomposition due to low precipitation and low mean annual temperatures.

Related Historic Sites

No sites associated with these routes have been placed on the National Register of Historic Places. However, the historical resources of the town of Wiseman have been studied by the Bureau of Land Management and a nomination to the National Register is contemplated. Wiseman currently has a population of between five and ten. Several cabins and buildings at the townsite may date back to the early gold mining days.

A pipeline construction camp is located on the site of Coldfoot and no historic buildings remain.

Although the population dwindled steadily, some persons remained in Bettles until the middle 1950's. However, with the development of a major airfield in 1945 and the new town of Bettles 5 miles upriver from the historic townsite, old Bettles became a ghost town. Many old structures and implements are still present.

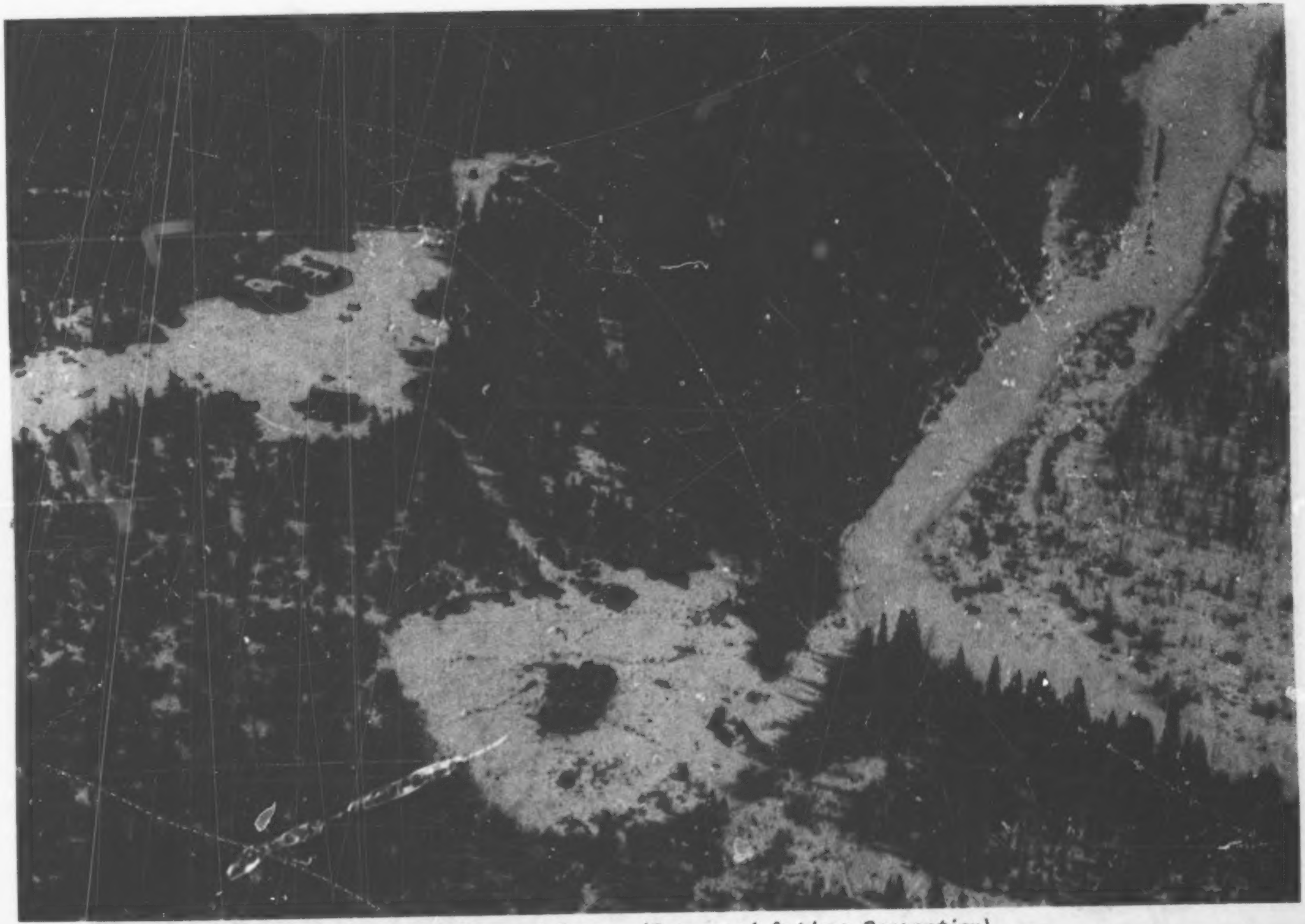
Several old buildings dating back to the 1906 rush to the Chandalar area are also still standing at the deserted site of Caro on the Chandalar River.

It is not known if any evidence of historic Fort Gibbon or Fort Hamlin on the Yukon River exists. Similarly, evidence of the settlements of Bergman, Arctic City, and Peavey on the Koyukuk and several camps on the South Fork is uncertain.

Historical Significance

In relation to other gold mining areas of Alaska and the Yukon, such as the Klondike, Nome, Fairbanks, and Iditarod, the Koyukuk and Chandalar districts were not major gold producers, nor did they attract as many people as the other areas. Trail use to the Koyukuk and Chandalar areas was correspondingly light. Only perhaps 200 persons utilized the Koyukuk trails in a peak year. The use of steamers on the Koyukuk also contributed to the light use of overland routes.

Total placer gold production by the Koyukuk district by 1970 amounted to just over 300,000 ounces or slightly more than $7 million. Chandalar production amounted to only 29,760 ounces or $780,000. Some additional gold in the form of lode deposits was produced in the Chandalar district.



Historic mining town of Caro. (Bureau of Outdoor Recreation)

The Koyukuk production represents approximately 2.3 percent of the placer production in the Yukon region of Alaska and about 1.4 percent of the total Alaskan production. Combined with the Chandalar, Koyukuk production amounted to 2.5 percent of the Yukon region and 1.6 percent of the Alaskan totals.

However, the Koyukuk was by far the most important district north of the Arctic Circle. The Koyukuk and Chandalar districts presented perhaps the greatest challenges and hardships for gold seekers in Alaska and the Yukon. The remoteness and severe environment were major obstacles to the prospecting and working of claims. The cost of equipment and supplies in the Koyukuk and Chandalar districts was among the highest in Alaska, due to the extremely long distances involved and the several breaks in the route. It is estimated that costs involved in mining reduced the profits from gold produced by 50 percent.

The trails leading to these districts were among the most northerly continuous trail connections in Alaska, stretching 200 air miles north of Fairbanks and 80 air miles north of the Arctic Circle (approximately 67° N. latitude). The mail carriers, miners, and others who mushed these lonely trails, with temperatures commonly 40 to 60 degrees below zero, demonstrated a rare determination and ability to survive incredible hardships.

PRESENT AND PROSPECTIVE TRAIL USES

Present Trail Condition

None of the historic route segments are currently being publicly maintained as trails. Yet, many of the various segments continue to be used and are discernable and passable in winter over large sections. Summer vehicular use and even pedestrian use is limited to only a few short discontinuous segments due to the presence of low brush, tussocks, muskeg and marshy areas, stream crossings, and other obstacles.

The recently constructed gravel road from the Yukon River to Alaska's North Slope is superimposed or closely parallels the old Dall River route to Coldfoot and the sled road from Coldfoot to Wiseman.

Scenic and Recreational Qualities

Most of the route segments from the Yukon River to the base of the Brooks Range near Coldfoot and Caro possess moderate scenic values. In comparison to other areas of Alaska, the low mountains, ridges, and flats of the Yukon River interior are not generally thought of as having special beauty or distinctive visual features.

The Brooks Range, on the other hand, possesses exceptional scenic values and has received considerable acclaim for its stark, rugged beauty. Broad, low-lying forested valleys dramatically contrast with the sweeping alpine tundra and barren rock outcroppings on steeply pitched adjacent slopes and towering peaks. The numerous clear-water rivers and streams contrast sharply with the milky, glacial rivers so common in other major mountain ranges in Alaska.

The historic route between Coldfoot and Caro and between Coldfoot and Chandalar Lake is highly scenic, especially in the Slate Creek divide area. However, much of this route is located along the rivers within very broad valleys on the southern flank of the Brooks Range. Many other areas of the Brooks Range are of greater scenic value, including the more modern local mining trails located north of the Coldfoot-Caro route in the Big Lake vicinity. In this area and in others in the Brooks Range, valleys are narrower, peaks are higher, and a greater sensation of being in the mountains exists.

Another segment of high scenic value exists along the old Chatanika-Beaver Trail between the Elliott Highway and the southern edge of the Yukon Flats. The old trail through the Beaver and Victoria Creek areas traverses a variety of vegetative zones from large white spruce forests along the extremely clear rivers to sweeping alpine tundra across the drainage divides. The exposed limestone outcroppings along the peaks and ridges of the White Mountains form a striking scenic backdrop along most of this trail section.

Over most of the various routes, a wilderness environment exists. Opportunities for recreating and viewing plants and animals in a natural setting, largely undisturbed by man, are excellent.

Obstacles to recreation are significant over these routes. Except for the Chatanika-Beaver segment, the routes are presently accessible only by commercial and charter air service. Summer overland travel along most of the routes, except in a few short alpine areas, is extremely difficult, if not impossible. Thickets, windfalls, tussocks, lakes, muskegs, marshes, mosquitoes, and other obstacles continually impede travel. Winter offers far superior travel conditions although the severe cold, deep snow, remoteness, and long distances limit recreational use.

The use of the historic trails by modern day tracked vehicles and all-terrain vehicles has in some cases substantially changed the character of the immediate trail area. The enlarged trail width, the cutting, knocking down, or scraping of vegetation, "cat" tracks, and other signs of the mechanized age detract in places from the historical and primitive recreational values.

Similarly, the construction of the gravel pipeline road from the Yukon River to the North Slope has diminished wilderness and historic values. The road, if opened to the public, would improve access to some of the trail areas.

Recreational Uses

The only significant recreational use presently occurring on any of the route segments is between the Elliott Highway at approximately mile 22 and the Big Bend area of Beaver Creek. A trail follows the old route approximately 20 miles down Wickersham Creek to a BLM public use cabin on Beaver Creek. From the cabin area, the trail continues down Beaver Creek approximately 5 miles to the Big Bend area of Beaver Creek. This trail receives significant use by snowmachiners, cross-country skiers, and dog mushers, especially in the late winter and early spring months. Open water caused by springs in the Big Bend area provides winter grayling fishing.

A 22-mile summer trail generally paralleling the winter trail has been constructed by BLM on a nearby ridge above the Wickersham Creek valley. This trail receives some use by hikers during summer months, although the trail is, as yet, in only fair condition.

Some nontrail-oriented recreational use is probably also occurring. Fly-in fishing and hunting are widespread over the region and some light use probably takes place in the vicinity of the various routes.

With the exception of the trails into Beaver Creek from the Elliott Highway, recreational trail-oriented use is not anticipated to increase significantly over the next several years.

Nonrecreational Uses

Various segments of the historic routes are currently used as basic transportation arteries. The old Dall Creek route and the sled road from Coldfoot to Wiseman have been overlain or closely paralleled by a gravel highway. This road was used in construction of the trans-Alaska oil pipeline and may be opened to the public.

The trail segment from Allakaket to Bettles is heavily used in the winter months by snowmachiners. In addition to the travel from Allakaket to the store and other services in Bettles and to the visiting of friends and relatives, the trail provides access for subsistence hunting, trapping, and wood-cutting. A short segment of the trail south from Allakaket towards Tanana (Fort Gibbon) is also used in winter subsistence activities, primarily by snowmachines and to a lesser extent by dog teams.

Snowmachines and a few dog teams also utilize the historic route north from Tanana for hunting, trapping, and wood-cutting activities. A military radar installation is located several miles north of Tanana and may utilize portions of the historic route for local access and the functions of the site.

The villagers of Beaver also depend heavily on subsistence activities, and the segments of the Beaver-Caro wagon road and the Chatanika-Beaver trail are traveled for many miles north and south of the village in winter hunting, trapping, and wood-cutting activities. This use is primarily by snowmachine, although a few dog teams may still be used. Some summer use of the Beaver-Caro wagon road by ATV or on foot may be occurring north of Beaver, although brush, marshy ground, and stream crossings impede most travel for more than a few miles.

Mining continues on a small scale in the Wiseman and Chandalar Lake areas. Portions of the historic routes are occasionally traversed by cats and other heavy equipment and ATV's used in mining operations and in supplying field camps.

Future selections of public domain lands by Natives and the State could result in additional nonrecreational use of lands along the route. Resource development by the State and Native corporations is expected.

The proposed extensions of the transportation system by the State of Alaska as of July 1973 include two routes which involve segments of the historic routes. A road which would pass through Bettles and Allakaket is proposed from the existing pipeline road to Kobuk. This route would cross and, at other places pass near, the old route between Allakaket and Bettles. Another road would connect Arctic Village with the pipeline road. This road would follow the old Coldfoot-Caro route from the pipeline road to the Middle Fork of the Chandalar, then up that river and over a divide into the East Fork of the Chandalar drainage.

A preliminary, conceptual analysis of transportation and utility systems in Alaska, released by the Bureau of Land Management in October 1974, recommends a number of corridors be reserved for such systems. Several of these involve the historic routes. A corridor for a number of transportation and utility modes is proposed from the pipeline road through Bettles and Allakaket to Kotzebue and the Seward Peninsula. A railroad corridor is proposed which would generally follow the Fort Gibbon-Koyukuk Trail from Allakaket to Tanana. A corridor for an oil pipeline and gas pipeline is recommended from the pipeline road up the Yukon River, across the historic Beaver-Caro sled road in the Beaver area, and up the Porcupine River. An alternative route for a highway, gas pipeline, and oil pipeline is recommended which would follow the Middle Fork of the Chandalar from its headwaters then down the Chandalar past Caro to Fort Yukon.

Tramway Bar, where gold was first discovered in the Koyukuk area in 1893. (Bureau of Outdoor Recreation)

CONCLUSIONS AND RECOMMENDATIONS

Qualification for National Scenic Trail Designation

The criteria used in evaluating the Koyukuk-Chandalar routes were as follows:

Criterion: Because of their special characteristics, National Scenic Trails should be nationally significant and be capable of attracting visitors from throughout the United States.

Finding: The overland trails and routes to the Koyukuk and Chandalar gold districts were traveled very lightly, even during boom years. These districts, although the most important north of the Arctic Circle, were quite modest in terms of numbers of stampeders, miners, and amount of production in comparison to other gold districts in Alaska. These trails and routes could not be considered to have national historical significance, and, in all likelihood, would not attract visitors from throughout the United States because of their remoteness, general lack of major scenic and historical attraction, and arduous trail conditions, both winter and summer.

Criterion: National Scenic Trails are designated for hiking and other compatible uses. The National Trails System Act prohibits the use of motorized equipment on these trails, except in certain circumstances.

Finding: Historic travel along the route took the path of least resistance rather than a particularly scenic route. In addition, most of the route segments were used primarily in winter months when snow and ice covered obstacles, open water, and rough terrain. Most of the historic Koyukuk and Chandalar routes have low potential for summer hiking use. Winter nonmechanized recreational use such as cross-country skiing and dog mushing is presently only occurring over one 20-mile segment and potential for greater use appears low over remaining segments.

Snowmachines are presently used as basic transportation and in subsistence activities along segments of the historic routes near Tanana, Allakaket, Bettles (Evansville), and Beaver. Heavy equipment and ATV's have utilized portions of the route in connection with mining and mineral survey activities.

Criterion: National Scenic Trails of historical importance should adhere as accurately as possible to their principal historic routes.

Finding: The Dall Creek route and the historic sled road from Coldfoot to Nolan (Wiseman) have been overlain or closely paralleled by a gravel highway. Except in this area, the historic routes are generally undeveloped and a trail could be constructed which would adhere closely to the historic routes.

Criterion: National Scenic Trails should be provided with adequate public access through connecting local or regional trails. Access should be located at reasonable intervals to provide for trips of various lengths.

Finding: Surface transportation currently exists only to the Chatanika-Beaver Trail segment at mile 22 of the Elliott Highway. If and when the pipeline road is opened to the public, surface access would be available to the segment from Bettles to Wiseman and to the Coldfoot-Caro route at Coldfoot. Air access exists at scattered airfields and bush strips. A connecting trail system and access to points along the routes would be extremely costly, difficult, and impractical to construct.

Criterion: National Scenic Trails should be primarily land based.

Finding: The routes to the Koyukuk and Chandalar districts were primarily land based.

Criterion: National Scenic Trails should be of sufficient length to encompass and provide appropriate access to the resources which are a basis for the trails designation.

Finding: The historic trail from Fort Gibbon to Coldfoot and Nolan (Wiseman) was 273 miles long. The route from Chatanika through Beaver to Caro was 195 miles in length. The segment from Caro to Coldfoot was 85 miles long. Other segments totaled hundreds of additional miles for an overall total of 1,273 miles.

Criterion: National Scenic Trails should be continuous except where no practicable or feasible interconnection exists.

Finding: A continuous trail following the historic route(s) could be constructed.

Conclusions

The various trails and routes leading to and through the Koyukuk and Chandalar gold strikes lack major historical, scenic, or recreational importance. They are not capable of attracting visitors from throughout the United States, and do not have good potential for hiking or other recreational uses. For this reason, designation as National Scenic or National Historic Trails is not warranted.

Recommendations

It is recommended that no further consideration be given to the Koyukuk-Chandalar routes as potential National Scenic or National Historic

Trails. As the various Federal and State agencies develop recreational plans for those areas adjacent to the new pipeline road, consideration should be given to developing trails from the road along short segments of the historic routes in those areas of high scenic values such as the Coldfoot and Wiseman areas.

Several historic townsites exist along the routes, which contain buildings and other remnants dating back to the Gold Rush Era. Because of the likelihood for loss of these historic remains, it is recommended that the land managing agencies work with private landowners in developing a plan for historic preservation and possible inclusion on the National Register of Historic Places for the townsites of Wiseman (Nolan), old Bettles, and Caro.

Historic sites along the Yukon and Koyukuk Rivers need to be surveyed for evidence of historic resources. Potential historic significance exists at Fort Gibbon and Fort Hamlin on the Yukon River; Bergman, Arctic City, and Peavey on the Koyukuk River; and several camps along the South Fork Koyukuk River.

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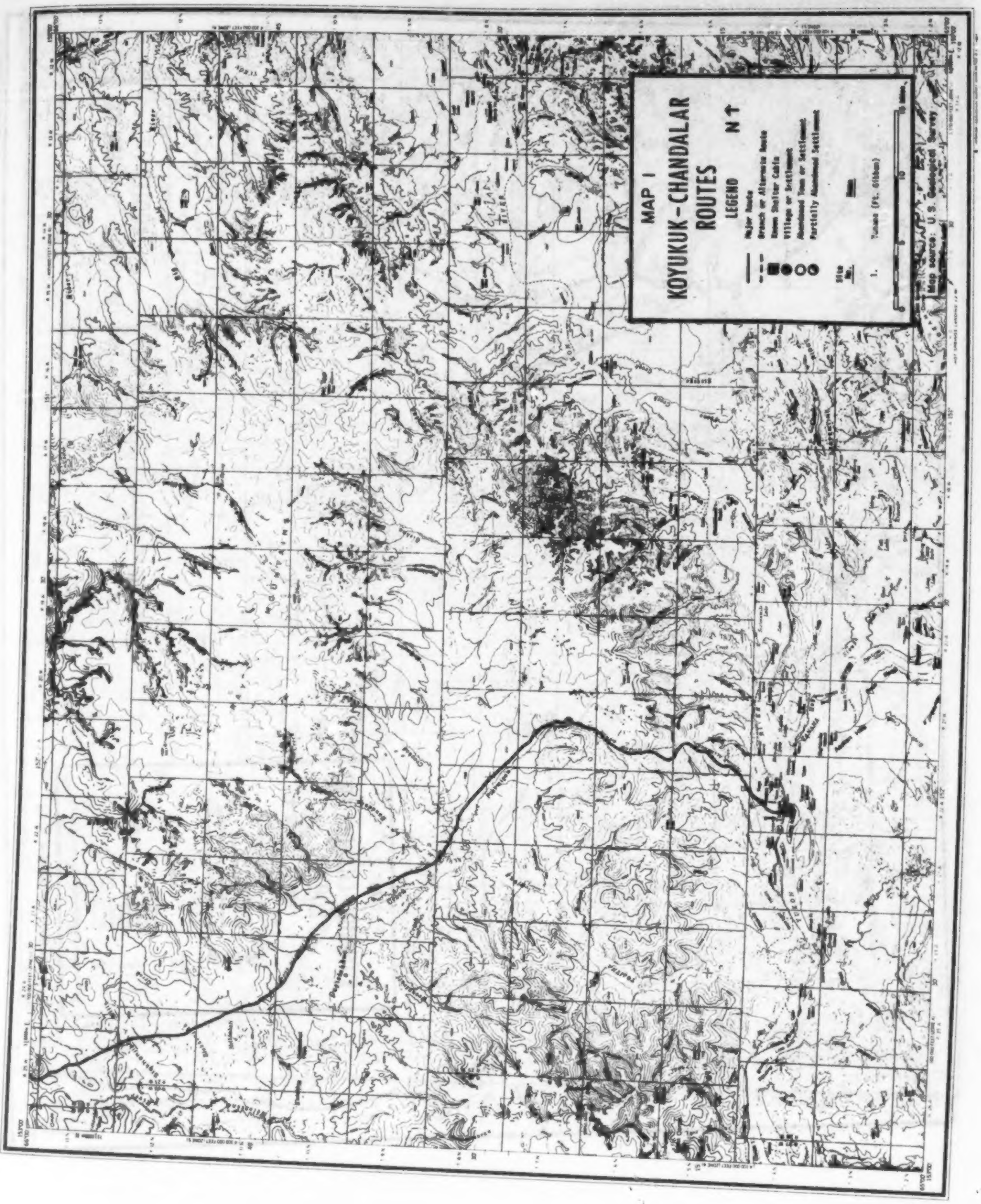
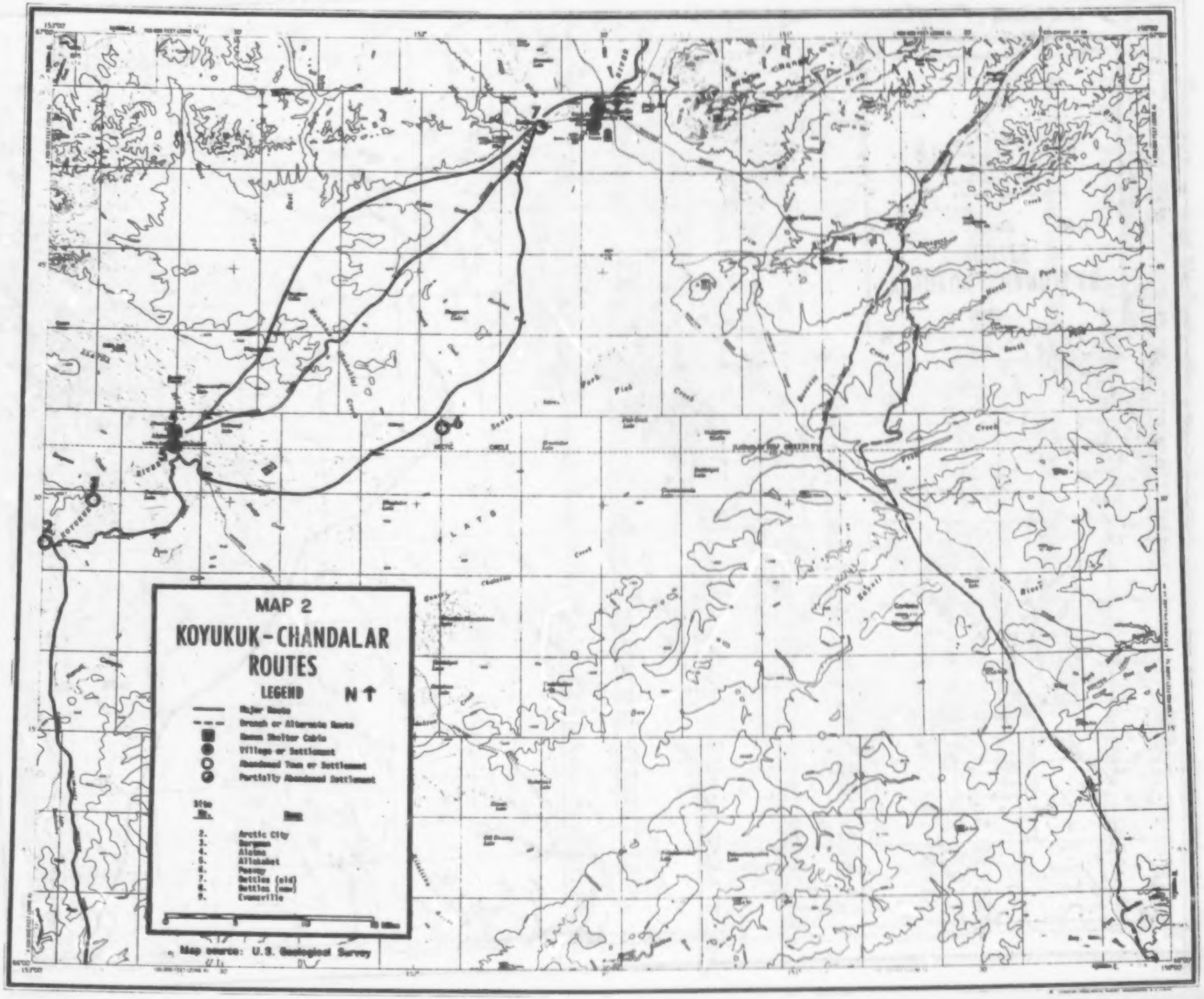

MAP I
KOYUKUK-CHANDALAR ROUTES
LEGEND
N ↑
Major Route
Branch or Alternate Route
Known Shelter Cabin
Village or Settlement
Abandoned Town or Settlement
Partially Abandoned Settlement
Site No.
1. Tanana (Ft. Gibbon)
0
5
10
20 Miles
Map source: U.S. Geological Survey

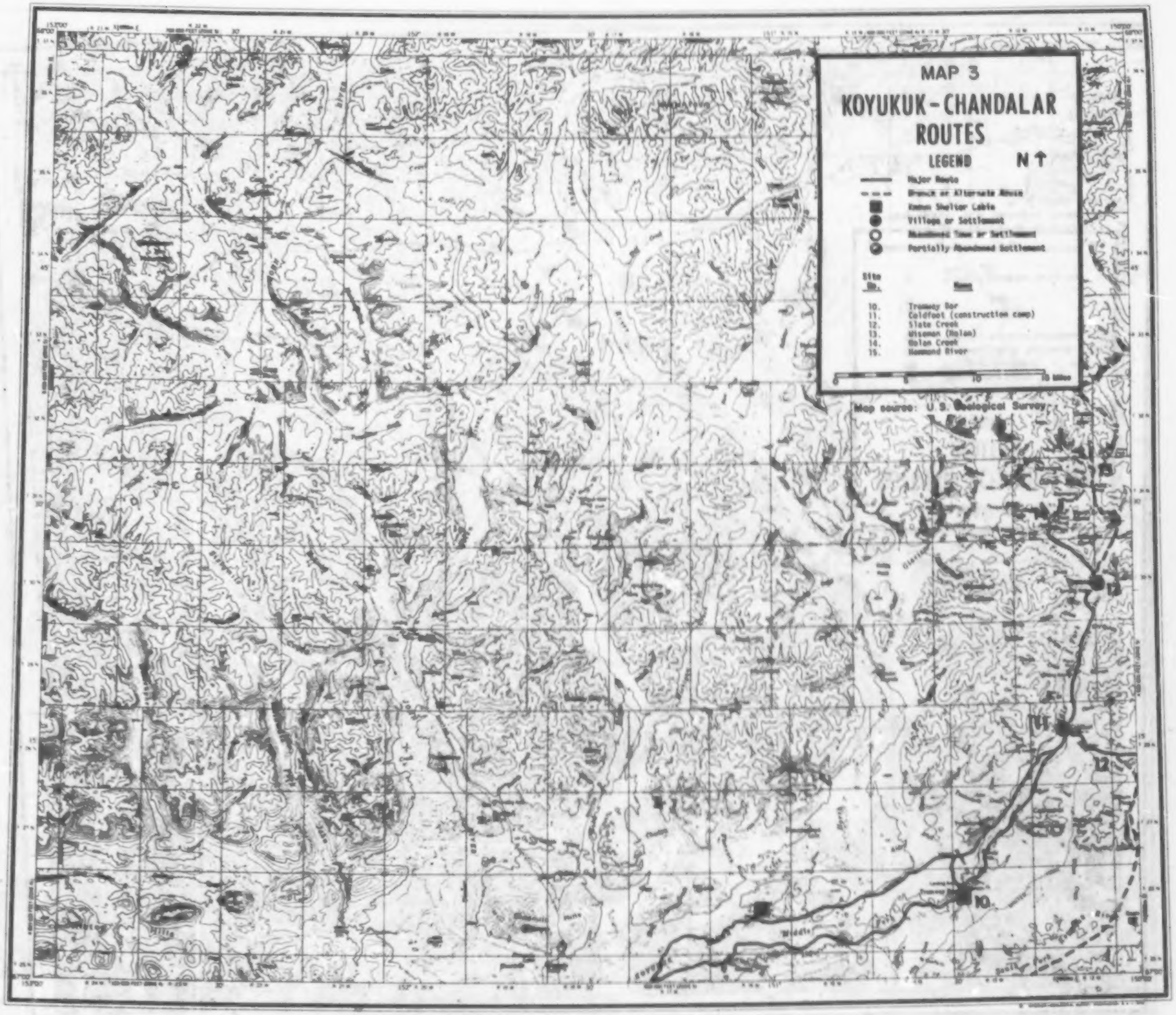


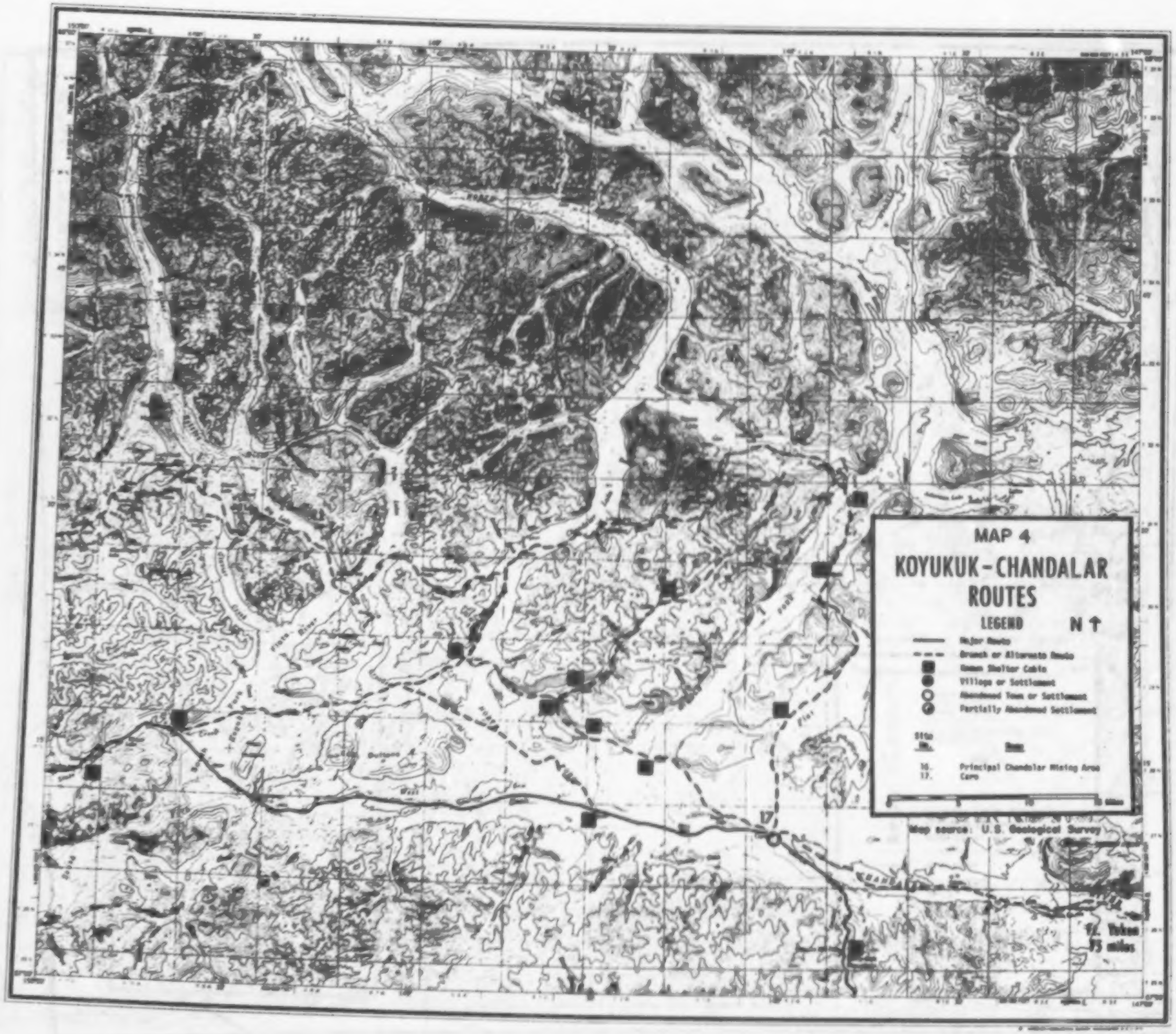
N ↑
LEGEND
Major Route
Branch or Alternate Route
Snow Shelter Cabin
Village or Settlement
Abandoned Town or Settlement
Partially Abandoned Settlement
Site No.
Name
2. Arctic City
3. Bergman
4. Alatna
5. Allakaket
6. Peavey
7. Bettles (old)
8. Bettles (new)
9. Evansville
Miles

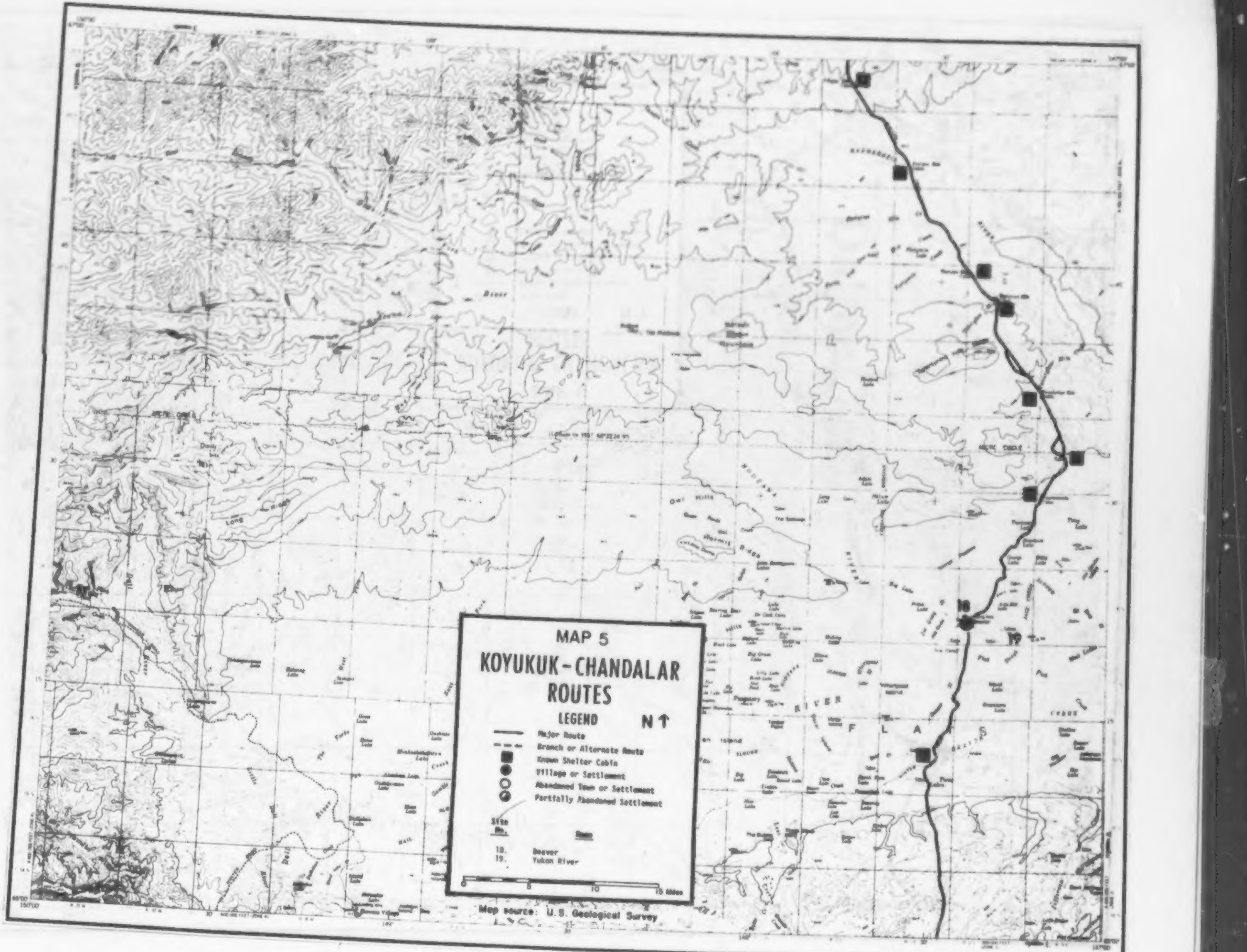
MAP 2

KOYUKUK-CHANDALAR ROUTES

Map source: U.S. Geological Survey


MAP 3
KOYUKUK-CHANDALAR ROUTES
LEGEND
N
Major Route
Branch or Alternate Route
Known Shelter Cabin
Village or Settlement
Abandoned Town or Settlement
Partially Abandoned Settlement
Site No.
Name
10. Tramway Bar
11. Coldfoot (construction camp)
12. Slate Creek
13. Wiseman (Nolan)
14. Nolan Creek
15. Hammond River
0
5
10
15 Miles
Map source: U.S. Geological Survey
10
11
12
13
15


MAP 4
KOYUKUK-CHANDALAR ROUTES
LEGEND
N ↑
Major Route
Branch or Alternate Route
Shelter Cabin
Village or Settlement
Abandoned Town or Settlement
Partially Abandoned Settlement
Site No.
Name
16. Principal Chandalar Mining Area
17. Caro
0
5
10
Miles
Map source: U.S. Geological Survey
Ft. Yukon 75 miles
16
17

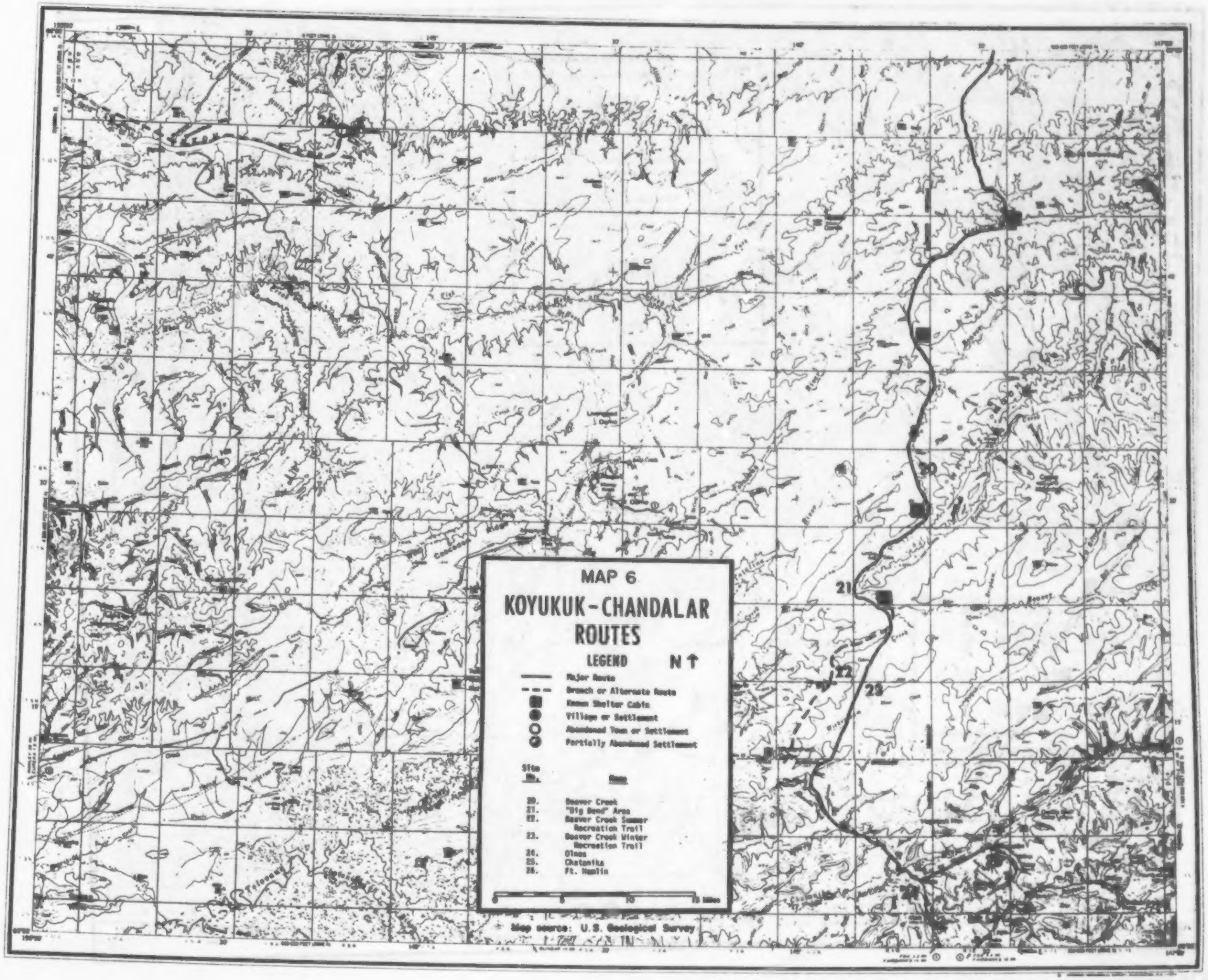


MAP 5

KOYUKUK-CHANDALAR ROUTES

LEGEND
N ↑
Major Route
Branch or Alternate Route
Known Shelter Cabin
Village or Settlement
Abandoned Town or Settlement
Partially Abandoned Settlement
Site No.
Name
18. Beaver
19. Yukon River
0
5
10
15 Miles
ARCTIC CIRCLE
RIVER
FLATS
Long Lake
Owl Hills

Map source: U.S. Geological Survey



MAP 6

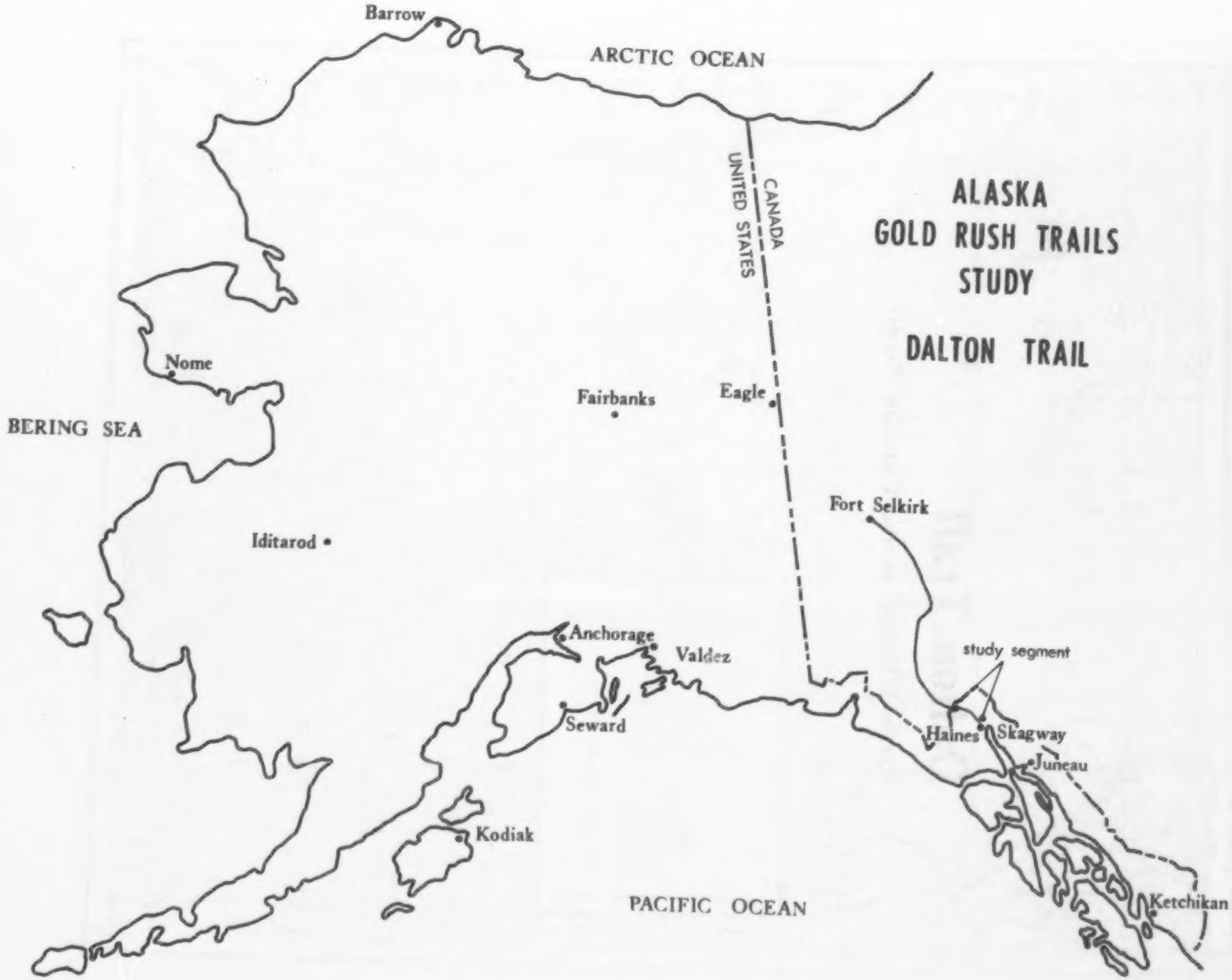
KOYUKUK-CHANDALAR ROUTES

LEGEND
N ↑
Major Route
Branch or Alternate Route
Known Shelter Cabin
Village or Settlement
Abandoned Town or Settlement
Partially Abandoned Settlement
Site No.
Name
20. Beaver Creek
21. "Big Bend" Area
22. Beaver Creek Summer Recreation Trail
23. Beaver Creek Winter Recreation Trail
24. Olnes
25. Chatanika
26. Ft. Hamlin
0
5
10
15 Miles
20
21
22
23

Map source: U.S. Geological Survey

Dalton Trail

Pyramid Harbor to the Canadian Border



ALASKA
GOLD RUSH TRAILS
STUDY

DALTON TRAIL

Barrow
ARCTIC OCEAN
CANADA
UNITED STATES
Nome
BERING SEA
Fairbanks
Eagle
Iditarod
Fort Selkirk
study segment
Anchorage
Valdez
Seward
Haines
Skagway
Juneau
Kodiak
PACIFIC OCEAN
Ketchikan

DALTON TRAIL (Pyramid Harbor to the Canadian Border)

BACKGROUND

For hundreds of years, the Chilkat Indians along the Chilkat River in southeast Alaska used a route through the rugged Coastal Mountains to trade with the so-called Stick Indians in the interior. The Chilkat people guarded this route jealously to prevent others from interfering with their trade monopoly with the Sticks.

In the late 1800's, increasing numbers of prospectors, explorers, missionaries, and others moved up the coast from Seattle, British Columbia, and other areas, and the secret trail of the Chilkats was soon discovered. In 1889, Edmund Bean is reported to have learned of the route up the Chilkat and Klehini Rivers into the interior. The year before, John Muir and a missionary named S. Hall Young had sailed into Chilkat Inlet and talked with Chilkat Indian leaders from the village of Klukwan. In 1881, Young returned with Sheldon Jackson and together they established Chilkat Mission, soon renamed Haines Mission, near the mouth of the Chilkat River.

Frank Leslie of Leslie Magazine organized a party in 1890 which explored the area up the Chilkat River and over the divide into the interior. One of the young scouts hired for this expedition was John "Jack" Dalton. The following year, Dalton and E. J. Glave explored the route, which became the Dalton Trail, to the Indian village on the Tatshenshini River, a tributary of the Alsek. Pack horses were taken into the interior on this trip for the first time.

Gold was discovered in the Klondike in the fall of 1896. Word reached outside in the late spring of 1897 and the gold rush was on. Jack Dalton, by this time, was a seasoned businessman in the upper Lynn Canal area and immediately set in motion plans to develop a toll trail to the gold fields. Although the routes over Chilkoot Pass and White Pass were shorter, they were also much steeper and more tortuous than the old Chilkat Trail. In July of 1897, Dalton hired a professional surveyor to map and survey his new personal trail to the Klondike following the historic Chilkat route.

By the early summer of 1897, a good pack horse trail had been constructed from Pyramid Harbor near the mouth of the Chilkat River to the summit of the Coastal Mountains in Canada. From there, the trail continued through more or less open country to Rink Rapid on the Yukon.

During that same summer, gold was discovered near the Dalton Trail on Porcupine Creek, 36 miles from Haines Mission. A small rush occurred over the next year. Gold mining in the Porcupine area continued for many years and played an important role in the local economy into the early 1900's.

The Alaskan and Yukon gold rushes created a need for law enforcement. Many posts were established in the early 1900's, the largest being Fort William H. Seward. This fort was established by the Army in 1903-04 and was located just outside of Haines Mission.

LOCATION AND REGIONAL ENVIRONMENT

General Alignment

The overall general alignment of the Dalton Trail in Alaska and British Columbia is shown on the following maps. It connected the northern portion of southeastern Alaska with the Yukon.

From its origin at Pryamid Harbor, it crossed about 5 miles of mud beach exposed at low tide, then proceeded along the west side of the Chilkat River, moved away from the river opposite Klukwan, then up the south side of the Klehini River to the vicinity of Boulder Creek. Here the trail crossed the Klehini and continued along the north side to the Canadian border.

From the border, the trail zigzagged to the first summit, a little over 3,300 feet, and down the Tatshenshini River to Dalton Post. From there, the trail went around Dezadeash Lake to Champagne, and then to Hutshi. From Hutshi, the main trail went down the Nordenskiold River to Carmacks and Rink Rapid on the Yukon. An extension of this route continued north to Fort Selkirk. A branch trail went west out of Hutshi to Aishihik Lake and then north across the upper Nisling River drainage to Fort Selkirk at the Pelly River and Yukon confluence.

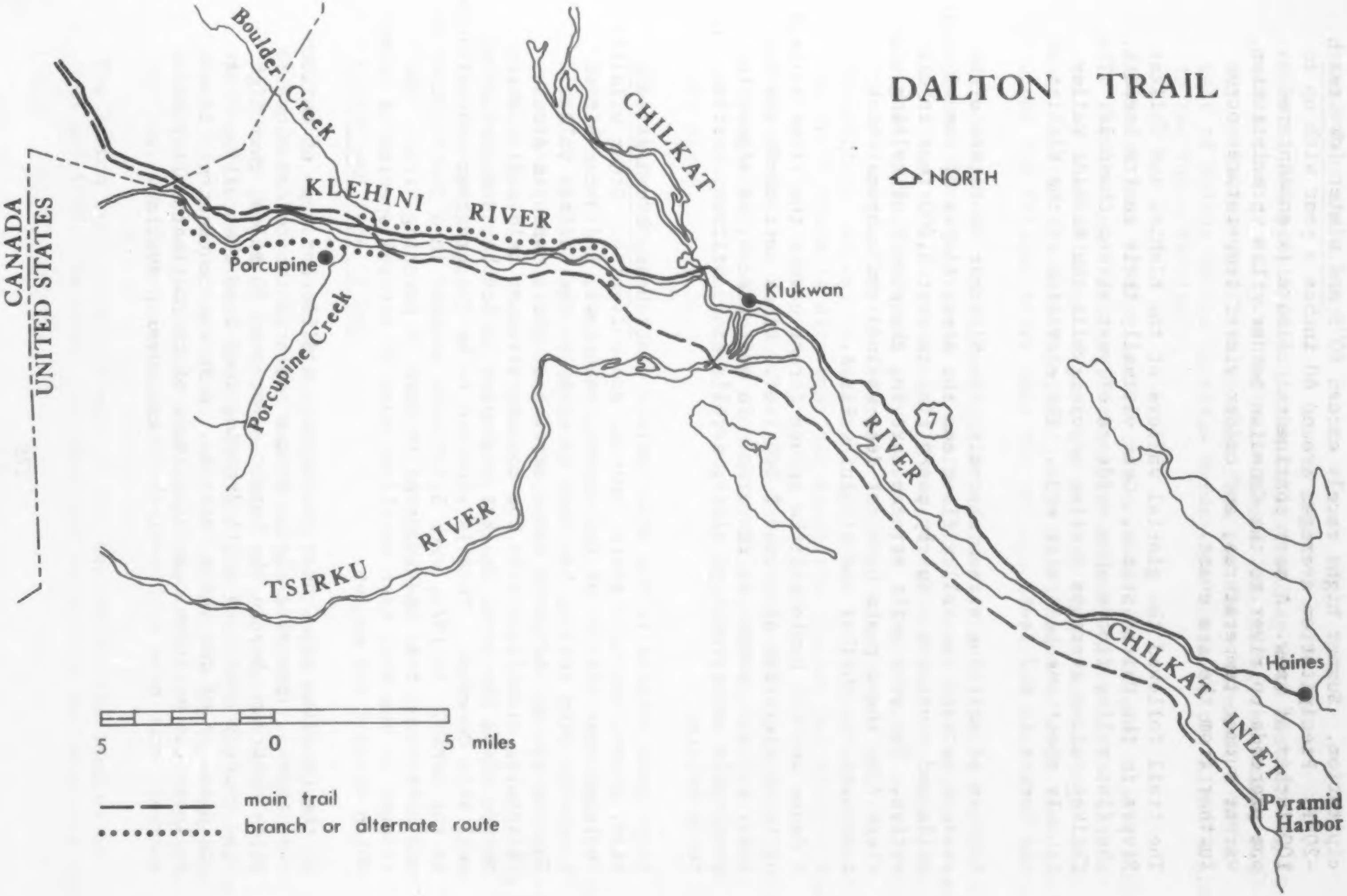
Because the Klehini River is a braided, glacier-fed river, channel changes were frequent and water depths varied greatly over the course of a season. Consequently, river crossing points varied, sometimes ranging from just above Klukwan to near the Canadian border.

Length

The segment in the United States was about 55 miles long. From Pyramid Harbor to Dalton Post in the Yukon was 126 miles. The length of the Dalton Trail from Pyramid Harbor to Rink Rapid on the Yukon was about 305 miles. The trail continued an additional 45 miles to Fort Selkirk. Dawson is located approximately 200 river miles downstream from Fort Selkirk. The major constructed portion of the trail extended approximately 65 miles to timberline.

Regional Climate, Topography, Vegetation, and Wildlife

The Dalton Trail area in the United States lies in a maritime climatic zone characterized by cool summers, moderate winters, and heavy pre-


DALTON TRAIL
NORTH
Boulder Creek
CHILKAT
KLEHINI RIVER
Porcupine
Porcupine Creek
Klukwan
CANADA
UNITED STATES
TSIRKU RIVER
RIVER
7
CHILKAT INLET
Haines
Pyramid Harbor
5
0
5 miles
main trail
branch or alternate route

cipitation. Summer highs rarely exceed 80°F and winter lows reach -20°F. Precipitation averages around 60 inches a year with up to 100 inches of snow. A more continental climate is encountered as one proceeds up river to the Canadian border. Less precipitation, warmer summer temperatures, and colder winter temperatures occur further from the sea coast.

The trail followed the glacial valleys of the Klehini and Chilkat Rivers in the United States. Over virtually their entire breadth, the flat valley floors show evidence of past stream channels. The Chilkat valley averages 2 miles across, while the Klehini valley is only about one-half mile wide. The elevation of the Klehini at the border is 812 feet.

Because of shifting stream channels, the historic route was often pressed between the valley floor and the steep slopes of the adjacent hills and mountains. Nearby peaks rise to over 5,000 feet in elevation. The many swift streams carrying the runoff of melting glaciers from these peaks have cut deep ravines and canyons which intersect the Chilkat and Klehini valleys.

A dense western hemlock-Sitka spruce forest covers the river valleys up to an elevation of around 2,500 feet. Black cottonwood and red cedar are also common in the area. In most places, an almost inpenetrable undergrowth of alder, devil's club, willows, berries, and ferns exists.

Large game animals in the area include black bear, brown/grizzly bear, moose, mountain goats, wolves, and wolverine. Other wildlife includes many species of furbearers, waterfowl, and other birds. Trumpeter swan nesting has been recorded in the Chilkat valley. This is the southernmost known nesting of these swans in Alaska. Of special significance is the concentration of bald eagles which occurs along the lower Chilkat beginning in October and persisting well into December. This is reported to be the greatest concentration in the world. In 1970, over 3,500 were counted in a 2-mile stretch--one cottonwood tree was reported to have 56 perching birds. The streams in the area have excellent runs of several species of salmon which attract the eagles.

On the Canadian side, near the border, a different type of environment exists. Sweeping alpine tundra replaces the forest about 15 miles upstream, beyond the border. For over 50 miles, this high open country continues until dropping down into the rolling hills and plateaus of the Yukon interior. A severe continental climate replaces the maritime coastal climate of the Chilkat valley and a sparser, more open spruce-birch forest cover prevails.

Land Uses and Access

About 1,500 people live in the Chilkat valley with most living in and around the City of Haines. Others live along the Haines Highway or Haines Cutoff which runs from the ferry terminal 3 miles east of Haines to the Canadian border and north to the Alcan Highway in the Yukon Territory.

Although most of the land is in a more or less natural state, timber is the leading industry of the area and many areas in the Chilkat valley show evidence of past and present timber harvesting. Fishing and tourism are also important. The development of iron ore deposits along the Chilkat River near the village of Klukwan has been proposed.

In addition to the highway which parallels the Chilkat and Klehini Rivers along their east and north banks respectively, access by air and water is also available. Haines is served daily by commercial air service from Juneau and by passenger and auto ferry service from Prince Rupert, British Columbia; Skagway, Alaska; and Seattle, Washington. Access by motorboat and canoe to various sections of the trail route is also possible along the Chilkat and Klehini Rivers.

Over 100 Indians continue to live in the historic village of Klukwan. Although tied to a dollar economy by Haines and the highway, some subsistence hunting, fishing, and trapping activities continue to take place.

General Land Ownership

Most of the land in the Chilkat and Klehini valleys is owned by the State of Alaska. The village of Klukwan recently selected lands surrounding the village under the terms of Public Law 94-204 passed January 2, 1976. Several parcels of private property exist along the Dalton Trail route, and mining claims may still be active in the Porcupine area.

HISTORIC RESOURCES

Period and Type of Use

Prior to construction of the Dalton Trail in the early summer of 1898, travel over the route was directly up the valley floor following the river banks, sand bars, and old channel cut. This route could only be followed when the glaciers were not melting and water levels were low. Thus, only in the fall prior to freeze-up and in the spring when the deep snows had melted in the lower elevations, was this route used.

The Dalton Trail received most of its use during the summers of 1898 and 1899. By 1900, the Yukon and White Pass Railroad had been completed between Skagway and Whitehorse, eliminating most of the hardships of that route. What advantage the Dalton Trail had over the rugged Chilkoot and White Pass routes was quickly lost when passenger and freight rail service became available.

Although the Dalton Trail traversed an easier pass from the Lynn Canal to the interior gold fields, it never attracted the numbers of stampeders that went over the nearby Chilkoot and White Pass Trails. While easier, the Dalton Trail was considerably longer than the other two--300 miles as opposed to 40 or 50 miles.

The largest traffic over the trail consisted of livestock. The Dalton Trail was well suited for horses, cattle, and sheep and played an important role in supplying booming Dawson with meat and pack animals. Over 2,000 head of cattle and 2,000 horses passed over the trail in the summer of 1898. Dalton charged $2 a head for cattle and $2.50 a horse for use of his trail. Animals were taken as far as Rink Rapid and sometimes Fort Selkirk where they were transferred to scows and floated down the Yukon to Dawson.

The trail also played a part in the famous U. S. Reindeer Relief Expedition. The food crisis in Dawson in the winter of 1897-98 prompted Congress to appropriate $200,000 for the purchase of a reindeer herd to ship north to the Yukon. Over 500 reindeer were shipped from Norway, brought across the United States to Seattle by rail, then shipped to Haines. With no feed for them at Haines, most starved to death before reaching the lichens in the alpine areas. They were driven over the Dalton Trail and northward to Dawson and encountered so many obstacles and tortures that only 114 animals reached their destination nearly a year later in January 1899. Needless to say, the food crisis had long since passed and it was the relief expedition which ended up having to be aided.

Jack Dalton also started the Dalton Pony Express Company during the summer of 1898. With 250 saddle horses, he attempted to establish passenger service between the port at Haines and river steamers operating between Dawson and Rink Rapid. For $150 (Burton reports $250), travelers could bridge the gap in water transportation and avoid the perilous Chilkoot and White Pass routes. However, the company soon went under when steamers began operating on the lakes in the upper Yukon between Whitehorse and the Chilkoot and White Pass, facilitating travel over those routes. Similarly, mail was carried by Dalton's Pony Express only once before being directed to the lake steamer route.

The gold strike on Porcupine Creek in the summer of 1898 brought 1,000 people into the local area during the next year--many coming over the Dalton Trail. In the early 1900's, however, the establishment of Fort William H. Seward outside Haines shifted the attention

The Chilkat River paralleling the Dalton Trail, 10 miles north of Haines. (Bureau of Outdoor Recreation) responsible State and local agencies to correct identified deficiencies, (4) the logistical problem of coordinating a large variety of accident reporting agencies and jurisdictions, (5) the need to keep the cost of overhead for safety planning in reasonable proportion with implementation expenditures, and (6) the difficulty in evaluating the success or failure of improvements so that future project decisions may be improved.

In analyzing program progress it is important to address both the status of the process of safety improvements, and the highway improvement projects implemented. The process for safety improvements will be discussed in terms of its three major functions. The first function is the collection and analysis of accident, traffic and highway data resulting in lists of hazardous locations, highway features, or operating conditions. The second is the study of these hazards to determine not only detailed corrections, but also the priorities and a schedule for project implementation. The third is the evaluation of projects and programs for use in future decision making.

DATA COLLECTION AND ANALYSIS

The past three annual reports have identified a slow but steady improvement in State systems for collection and analysis of accident, traffic, and highway data. While this improvement continued this past fiscal year, the problems being faced are becoming increasingly more difficult. For example, it is relatively straightforward to establish a precise location reference system for Interstate highways, but to establish an equally precise reference system for the millions of miles of local roads and streets is a complex and perhaps impractical task. Therefore, it is necessary to consider precision required and analyze alternate means to achieve it before implementation is possible.

Both high hazard location projects and roadside obstacles elimination projects must be built on the same precept. The common ground is that accident experience is examined to determine hazardous roadway locations, appurtenances, designs, etc. as a first step to their correction. A degree of confidence in these defined problems can only be gained through comprehensive and effectively operating accident, traffic, and highway data systems.

Reference System -- An important element of the highway safety program is a system to locate accidents, highway features, design elements, and operating features on the roads and streets where they occur. There is a wide range of possible approaches to referencing. Acceptable techniques include field mile-posting, grid systems, link-node, physical features, and even the experimental Loran-C navigation system. The key is that a system be devised and implemented which can be operated by police and highway officials

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with a degree of accuracy that allows correlation and analysis of data.

Generally, State highway systems are completely referenced and local highway systems are not. The status of reference system implementation is shown in Table 3 in Appendix B. Several States indicate ultimate completion in the early 1980's, but this may not be realistic because in many cases it depends on voluntary cooperation by local agenices. Local agencies may lack sufficient resources or may not perceive a benefit in proportion to the effort. A State's effort then must be directed at referencing the highway miles which cover the maximum number of accidents, realizing that 100 percent coverage is a desirable but perhaps unattainable goal.

Accident Reporting System -- Two types of deficiencies--local road coverage and traffic record system capabilities--plague many States' data systems, Since the 1966 Highway Safety Act, Highway Safety Program Standard 10, Traffic Records, was intended to promote a comprehensive and coordinated system of accident data collection. Even with this longstanding interest, the report, "An Evaluation of the Highway Safety Program" (DOT, July 1977) indicated implementation of Standard 10 often was deficient in terms of capabilities supplied to State and local Highway agencies for roadway analysis.

Table V-5 showing implementation status of accident data files for local road systems, demonstrates the seriousness of this local road deficiency. Roughly 50 percent of the States have implemented accident data files on local road systems. This table does not consider whether or not the coverage is statewide.

Even on State highways, many traffic record systems were designed and implemented for enforcement or liability considerations. While these are legitimate uses, they do not provide adequate capabilities for roadway analysis. The consideration of highway and traffic data files has not taken place.

Traffic and Highway Data -- Table 4 of Appendix B shows the degree to which traffic and highway data may be related to the reported accident data. While there are very serious questions about the degree to which detailed highway data are needed, especially on lower order roads, the inability to correlate traffic (i.e. volume) data with accident data is a serious deficiency. Without this measure of exposure, only gross identification of hazardous locations can be made and other more sophisticated analyses are impossible.

Data Analysis -- The capability of the basic data systems has a cascading impact on all subsequent activities. Table 4, Appendix B indicates that the criteria for definition of a hazardous location

TABLE V-5

IMPLEMENTATION STATUS OF ACCIDENT DATA FILES BY LOCAL ROAD SYSTEM
(Number of States)

Road System	Implemented	Not Implemented
Local - County	25	25
Local - City	29	21
Local - Other	19	31

Source: "Evaluation of Highway Safety Program Standards," U.S. Department of Transportation, Federal Highway Administration, March 1977 varies by State. Some of this variation can be accounted for by the basic data system differences. Traffic and highway data are least likely to be available on local road systems. Therefore, many States must rely on the number of accidents only as criteria for hazardous locations on local roads systems.

This discussion does not infer that hazards can only be identified through analysis of a particular State's data. Detailed research studies or experience in other States can be used in the identification of hazardous locations and may in some cases be preferable. The correction of potential accident locations is a vital part of the safety program. Many States report that this type of corrective measure can not compete sucessfully for funds against improvements at the so-called "high accident locations."

Even when hazards are identified through detailed research, data analysis is still necessary to quantify the scope of the problem and potential impact. Table V-6 shows several types of inventories which are maintained and the percent of States maintaining them. It is not surprising that lower levels of capability exist at the local level, but it is surprising that there are States that do not maintain several of the inventories that may be considred basic, such as accidents and design and operating features.

TABLE V-6

PERCENT OF STATES MAINTAINING SELECTED INVENTORIES BY ROAD SYSTEM

Elements	State* Roads	Local Roads*		
		County	City	Other Local
High accident locations	98	43	45	37
High accident and design operating features	83	22	22	16
Roadway lighting	73	3	12	9
Hazards in right-of-way	98	21	23	21
Low skid resistance	100	28	14	12
Rail-highway grade crossings	86	79	81	58
Traffic control devices	86	18	24	18

* Number of Respondents vary by Elements from 34 to 51 States.

Source: "An Evaluation of the Highway Safety Program," U.S. Department of Transportation, July 1977.

DEVELOPMENT AND IMPLEMENTATION OF SAFETY IMPROVEMENTS

After hazards are identified, several additional steps are necessary before highway projects may be implemented. Detailed studies with possible supplemental data gathering are necessary to develop the proper corrective measures. Once measures have been developed they must be prioritized and scheduled for implementation.

States have generally excelled in the study of identified hazards and the development of improvement projects. Special study aids, such as computerized collision diagrams, conflicts analysis, speed studies, skid testing, and erratic maneuver studies have been developed and are being refined to improve study capabilities.

Even though a problem is identified and a solution developed, the project must compete against many other problems and solutions for scarce improvement funds. To this end, States have developed criteria to be used to set priorities for project implementation. Table 5 of Appendix B summarizes these factors for both roadside obstacle elimination and high hazard location correction. The biggest contrast between the two is that the roadside obstacle factors consider the environment (e.g. ADT, speed, highway type, etc.) of the obstacle rather than accident experience which is of great importance to the high hazard program.

This tends to highlight the subtle difference between the two programs. Roadside obstacle elimination is more concerned with removing potential for accidents and less with accident experience at a particular location or obstacle. On the other hand, the high hazard program stresses the need for accident experience at a particular location.

EVALUATION OF PROJECTS AND PROGRAMS

States are becoming increasingly aware of the urgency connected with performing evaluations of the effectiveness of the safety projects and programs. The results of nationwide evaluations performed to date are included in Chapter VIII.

In promoting the need for effectiveness evaluations, FHWA has taken two approaches. The first is to specify data required to fulfill the requirements of 23 USC. Only a few States were unable to provide data for use in the nationwide evaluations. These included Iowa, New Jersey, New York, Rhode Island, Puerto Rico and the Territories. The second approach is through the development of a detailed training course which promotes more comprehensive and higher type evaluations than those performed using the minimum data requirements.

IMPLEMENTED IMPROVEMENT PROJECTS

Analysis of safety improvement programs requires a balancing of "quality and quantity" considerations. In other words, the quality of projects selected could be enhanced if additional data were collected, but in the waiting period no safety improvements would take place. On the other hand, hasty implementation of ill-conceived and ill-defined projects will neither accomplish program objectives nor be a wise expenditure of scarce public funds. Optimum implementation can only be achieved through a careful balancing of both considerations.

While quality in terms of safety effectiveness will be presented in Chapter VIII, this section will seek to analyze other measures of implemented projects. Measures discussed will include level of obligation of safety construction funds, obligation of funds by highway system, and types and size of projects implemented.

Level of Obligation

As previously mentioned, the 1976 Highway Safety Act combined funding sources for the High-Hazard Location and Roadside Obstacle programs. As such, it is difficult to trace a continuous record of obligation levels between the three funding programs--High Hazard, Roadside Obstacle and combined.

Generally, the obligation levels in these three programs are behind the pace set by safety construction programs as a whole. Tables 1d, 1e, and 1f of Appendix C show the apportionments and obligations of the States, Territories, District of Columbia, and Puerto Rico as of September 30, 1977. Fourteen States have obligated all of their high hazard money; only nine have obligated all of their roadside obstacle money; and six all of their combined program money.

The obligation of safety funds has been an FHWA emphasis area since passage of the 1973 Act and many States have objected to the emphasis on spending. Yet, other States have utilized this as an indicator of program efficiency. For example, the Ohio Department of Transportation and the FHWA Ohio Division Office performed an indepth program review and evaluation of their project procedures for the High-Hazard Location program. Rather than change their program objectives--implementation of low cost, high effectiveness projects--the review concentrated on measures to expedite and simplify "standard operating procedures." Thus, procedural alterations were made to enhance delivery of needed improvement projects.

Obligation by Highway Systems

A predominant proportion of these funds have been obligated on the State/Federal-aid primary system. When comparing State versus local highway system expenditures, Tables 3d, 3e, and 3f of Appendix C indicate that 90.9 percent, 91.0 percent, and 86.8 percent of obligated funds were on State systems for the High Hazard, Roadside Obstacle, and combined programs, respectively.

Concerning Federal-aid systems, an analysis indicates that an inordinate share is being expended on primary systems for all three programs. Table V-7 shows funding distribution by Federal-aid Primary (excluding Interstate), Secondary, and Urban systems as well as various highway system measures which would indicate funding need. Even though indicators suggest this unbalance, when the program was initially implemented, accident, highway, and traffic data existed mainly on the higher order systems. Thus, development of projects would understandably be mostly for these systems. As the table shows, funding under the combined program has shifted slightly toward the lower class highways.

Improvement by Project Type and Size

While obligations have decreased for the High Hazard and Roadside Obstacle programs during the TQ and FY 1977, the combined program has been obligated to a level of $76.4 million, which is about 80 percent of the total of the two individual programs. Figures V-2, V-3, and V-4 show the obligation of funds by project type for the last three fiscal years and transition quarter (TQ).

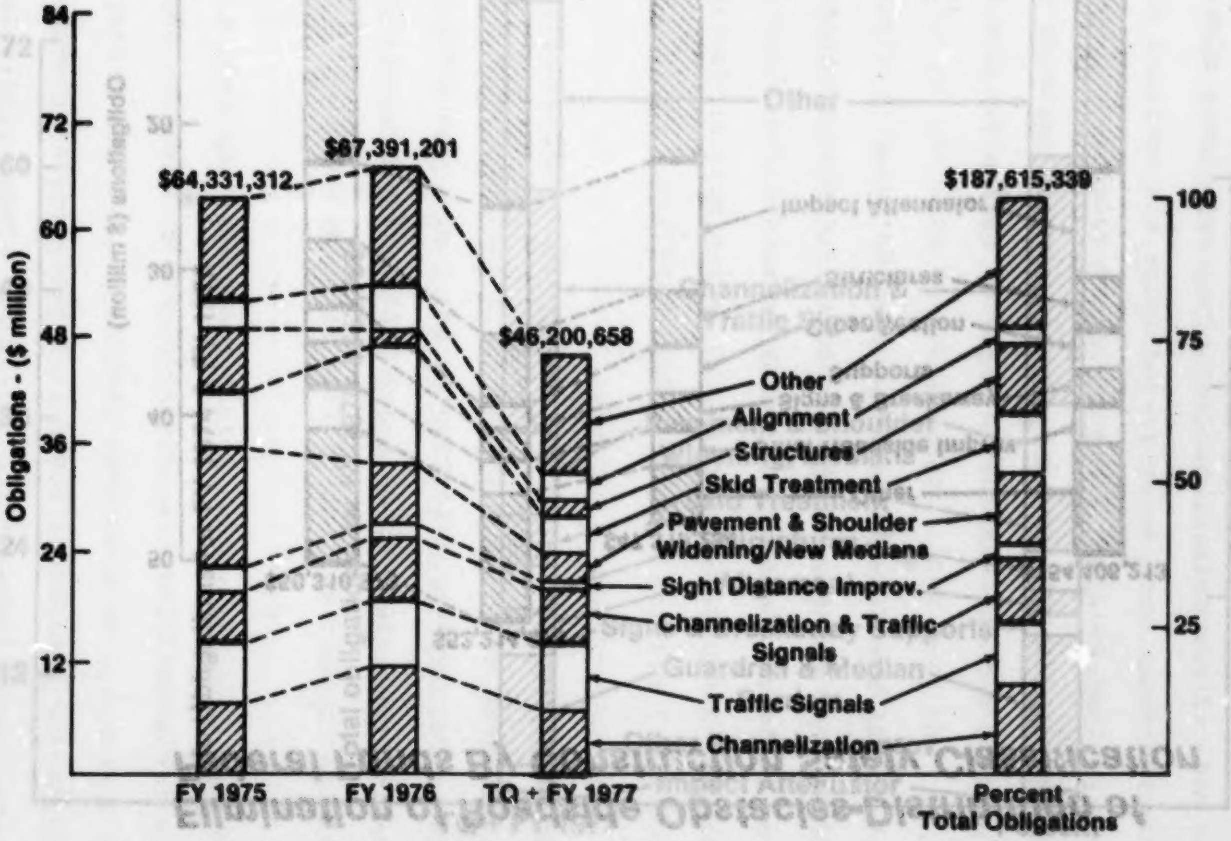
TABLE V-7

Comparative Distribution of Safety Construction Expenditures, Highway Miles, Accident Experience and Travel by Federal-Aid System

	Federal—Aid System				
	Primary (Except Interstate)	Secondary	Urban	Misc.	Total
High-Hazard Location ('73 Act) ($1000)	$117,850 (62.8%)	$35,174 (18.7%)	$27,180 (14.5%)	$7,411 (4.0%)	$187,615 (100%)
Elimination of Roadside Obstacles ('73 Act) ($1000)	$116,014 (75.1%)	$23,828 (15.4%)	$5,506 (3.6%)	$9,059 (5.9%)	154,406 (100%)
Combined Program ('76 Act) ($1000)	$ 46,140 (60.4%)	$12,695 (16.6%)	$11,692 (15.3%)	$5,920 (7.7%)	76,448 (100%)
1975 Highway Miles	216,593 (24.0%)	630,333 (69.7%)	57,432 (6.3%)	–	904,358 (100%)
1975 Fatal Accidents	12,178 (47.1%)	9,313 (36.0%)	4,384 (16.9%)	–	25,875 (100%)
1975 Injury Accidents	414,738 (39.3%)	291.542 (27.6%)	348,592 (33.1%)	–	1,054,872 (100%)
Vehicle Miles of Travel (millions)	372,932 (50.3%)	206,376 (27.8%)	162,526 (21.9%)	–	741,834 (100%)
1975 Fatal Accidents per 100 mvm	3.27	4.51	2.70	–	3.01
1975 Injury Accidents per 100 mvm	111.21	141.27	214.48	–	140.0

FIGURE V-2

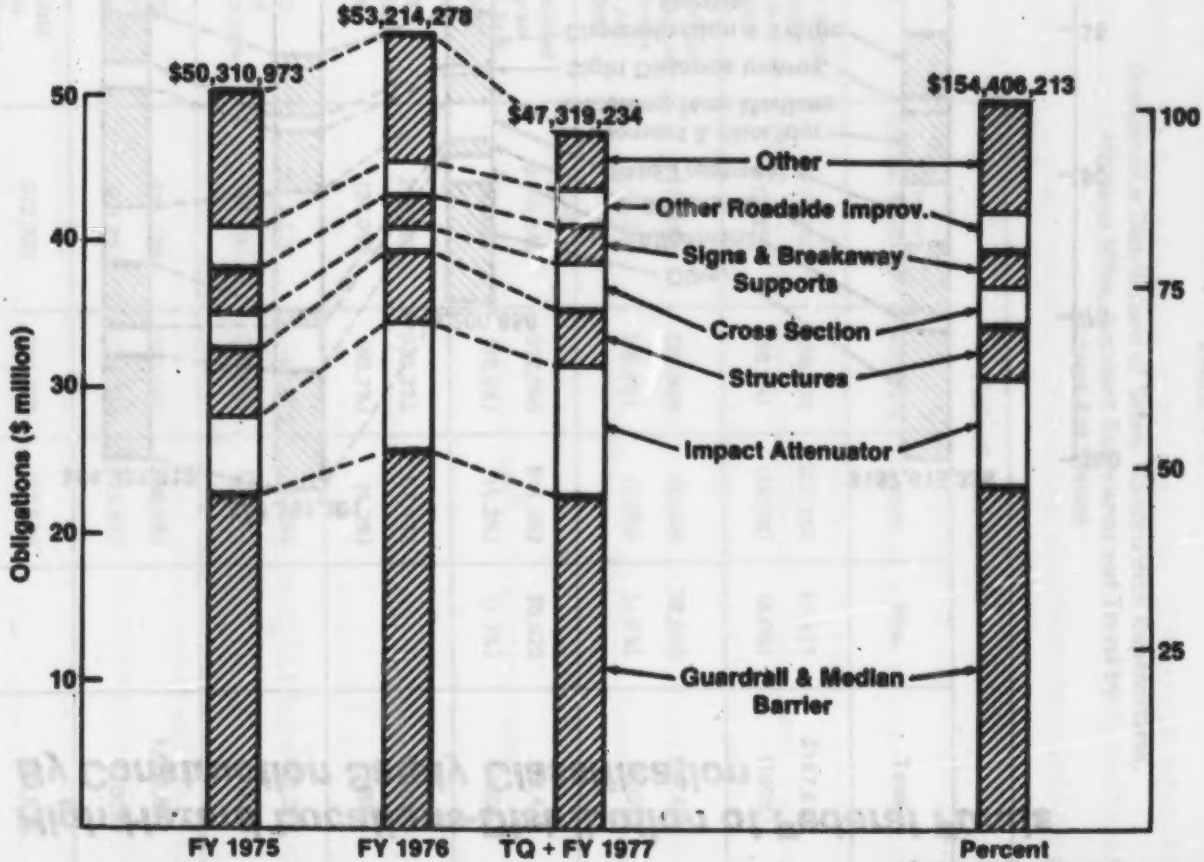
High Hazard Locations-Distribution of Federal Funds By Construction Safety Classification



Total Obligation for FY 1974 = $9,692,167

FIGURE V-3

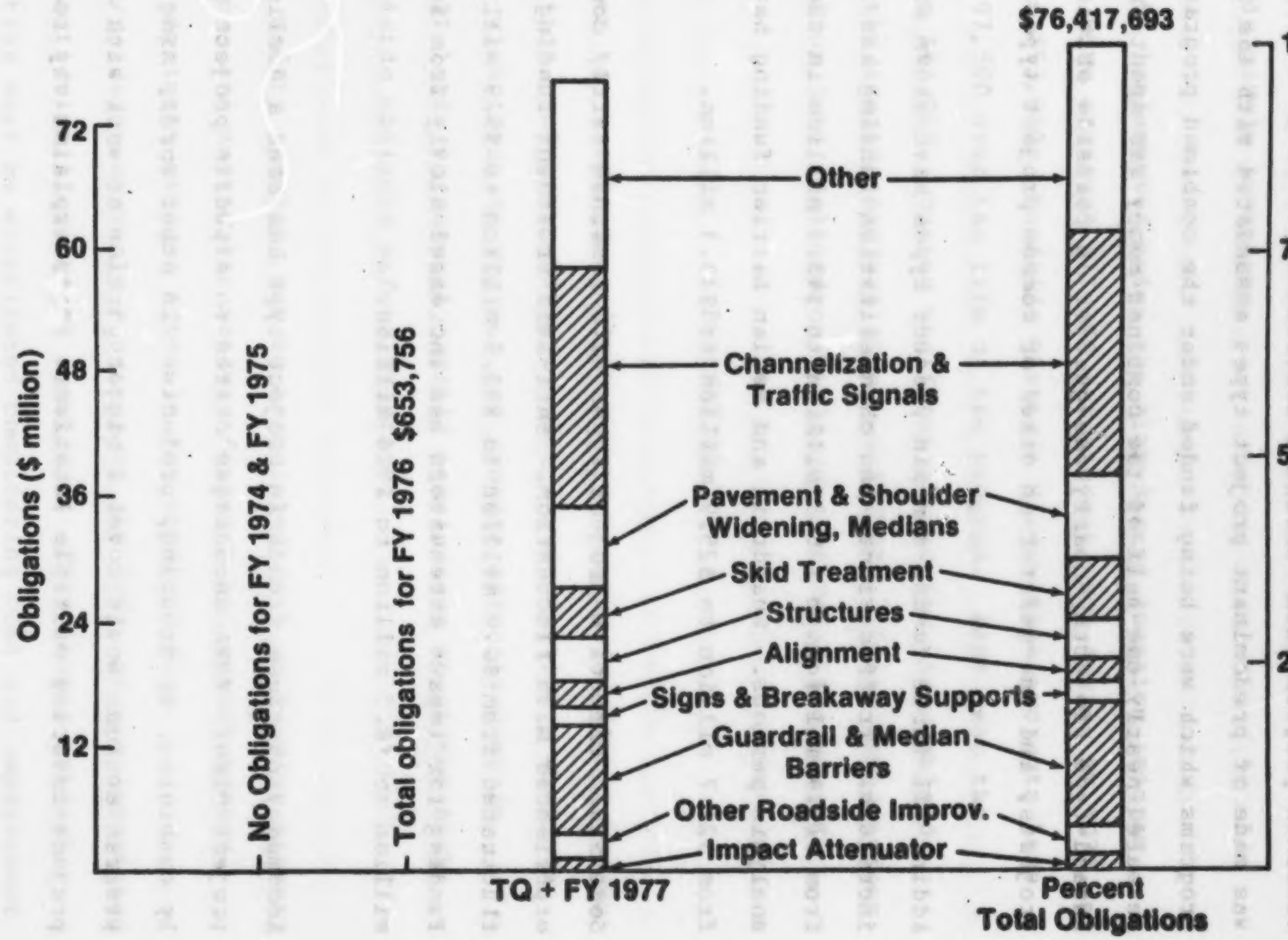
Elimination of Roadside Obstacles-Distribution of Federal Funds By Construction Safety Classification



Total Obligations for FY 1974 = $3,561,729

FIGURE V-4

High Hazard/Roadside Obstacles-Distribution of Federal Funds By Construction Safety Classification



More "High-Hazard-type" projects are being implemented under the combined program than "Roadside Obstacle-type" projects. Analysis was made of predominant project types associated with the individual programs which were being funded under the combined program. This revealed nearly one-half of the combined money was spent on high hazard-type projects, nearly one-quarter on roadside obstacle-type projects, and one-quarter on other or common project types.

Adding all three funds, certain project types have shown dramatic increases. Traffic signal and channelization funding has increased from $19.4 million to $26.3 million to $43.1 million in the three analysis periods. Guardrail and median barrier funding have gone from $22.7 million to $25.9 million to $34.1 million.

Some other effective project types have remained fairly constant or experienced mild fluctuation. Anti-skid treatment funding has fluctuated from $6.4 million to $13.5 million to $9.9 million. Funding for impact attenuators has increased slowly from $6.2 million to $8.5 million to $9.6 million.

Accompanying these trends in project type has been a decline in project size. FHWA encourages States to expedite project processing by combining, or grouping, projects. In other words, single FHWA program actions would cover a bigger portion of work with a single project covering multiple locations. This explains why roadside obstacle projects, programed to cover more roadway miles, are on the average, larger than high hazard projects which are oriented more towards single locations.

The projects implemented under the High-Hazard Location program since 1973 have averaged $77,900 per project, but during FY 1977 and TQ averaged $53,600. Roadside Obstacle Elimination projects have averaged $97,500 over the life of the program. Last year the average was $88,000. During the first period for the combined programs, the average project size was $77,800. These computations were made from data included on Tables 2c and 2d of Appendix C.

EVALUATION

This chapter has examined accident data, progress in safety process implementation, and progress in project implementation. Combining these data with those on project and program effectiveness in Chapter VIII leads to several overall conclusions about the high hazard/roadside obstacle safety programs:

o First, safety problems can be associated with particular highway locations and particular roadway features and appurtenances. The predominant project types in the combined high hazard/roadside obstacle programs of the 1976 Act are associated with particular high hazard locations. Even though project priorities must be established considering cost and improvement opportunity, most States data systems do not allow elimination of roadside obstacles systemwide corrections to compete on equal footing with "high accident" locations. It will require continued vigilance to assure that all roadway investment opportunities receive equal consideration before investment of funds.

- Implemented safety projects have demonstrated safety effectiveness. With this in mind, continued emphasis should be placed on complete implementation of an organized process for safety improvement. Program management actions need to be clearly focused on this goal.

- Certain phases of the program are lagging in several States. As with safety deficiencies, program deficiencies are easy to identify, but more difficult to determine the cause and needed corrective action. Most deficiencies are related to personnel shortages and a relatively low amount of available funds. Some deficiencies are due to lack of top level management support.

  In all cases, comprehensive program reviews such as that performed in Ohio are the proper first step in shoring up sagging implementation efforts.

- As mentioned in the previous item, personnel and funding are becoming more scarce. Personnel reductions will lead to increased use of consultant efforts to accomplish program objectives. Because of administrative requirements, the use of consultants is difficult for relatively low cost safety projects. The net result may not be accomplishment of program objectives. At the State and local level, manpower ceilings artifically hold down the number of personnel, even when fiscal resouces may be available.

- The first year operation of the combined high hazard/roadside obstacle program was successful. States' abilities to plan, implement, and evaluate low cost, high-effectiveness projects will be enhanced by continued implementation of the process for safety improvement. Based on this success, further consolidation of safety categories appears feasible. Unfortunately, the highway safety improvement program has not attained sufficient support to warrant its combination with other highway improvement programs. However, an ultimate program goal must be to place safety concerns on a par with mobility, environment, economic, and other transportation considerations.

VI. OFF-SYSTEM ROADS

23 USC 405 (Repealed)

23 USC 219

PROVISIONS OF THE LAW

Section 405 of Title 23 USC (Section 230 of the Highway Safety Act of 1973) required the identification of projects for the correction of hazards on all roads not on the Federal-aid system and the systematic correction of the hazards. For roads not on the Federal-aid system, the law provided 90 percent Federal-aid funding for removal of roadside obstacles, correction of high-hazard locations, elimination of hazards at rail-highway grade crossings, and proper marking and signing.

Section 135(c) of the Federal-aid Highway Act of 1976 repealed 23 USC 405. This was done primarily to combine two off-system programs--Safer Roads Demonstration (Secton 405) and the Off-System Roads (old Section 219) programs. New Section 219 provides for the construction, reconstruction, and improvement of the roads not on the Federal-aid highway system, including but not limited to, the correction of safety hazards, the replacement of bridges, the elimination of high-hazard locations and roadside obstacles. As stated in Chapter III, the Highway Safety Act of 1976 also made funds available specifically for grade crossing safety improvements off the Federal-aid system.

While Federal reporting is no longer required for these programs, except for the off-system grade crossing improvements, States are still in the process of obligating Safer Roads Demonstration funds, and the Federal Highway Administration continues to assess the impact of this program.

ACCIDENT DATA

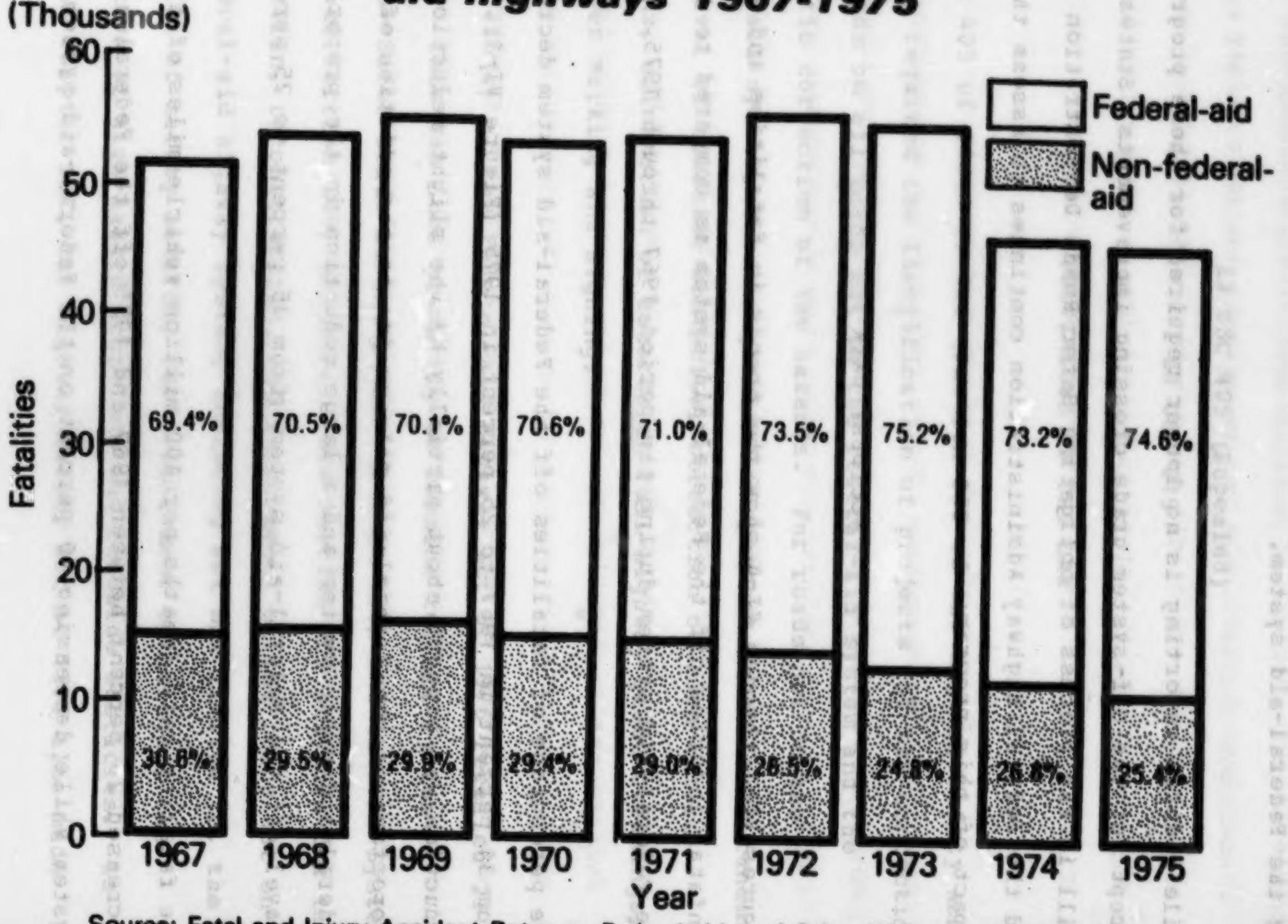
Figures VI-1 through VI-4 show the trends in fatalities and nonfatal injuries off the Federal-aid system as compared to those on the Federal-aid system during the period 1967 through 1975.

The percentage of fatalities off the Federal-aid system decreased from 31 percent in 1967 to 25 percent in 1975 (Figure VI-1). This reduction was brought about partially by the slight reduction in the proportion of non-Federal-aid mileage due to the addition of the Federal-aid urban system and a large reduction in the proportion of travel off the Federal-aid system (from 35 percent to 25 percent).

The fatality rate (deaths per 100 million vehicle miles of travel) decreased 25 percent between 1967 and 1975 off the Federal-aid system while decreasing 40 percent on the Federal-aid system (See

FIGURE VI-1

Fatalities on federal-aid and non-federal-aid highways 1967-1975



Source: Fatal and Injury Accident Rates on Federal-aid and Other Highway Systems/1975, U.S. DOT, FHWA

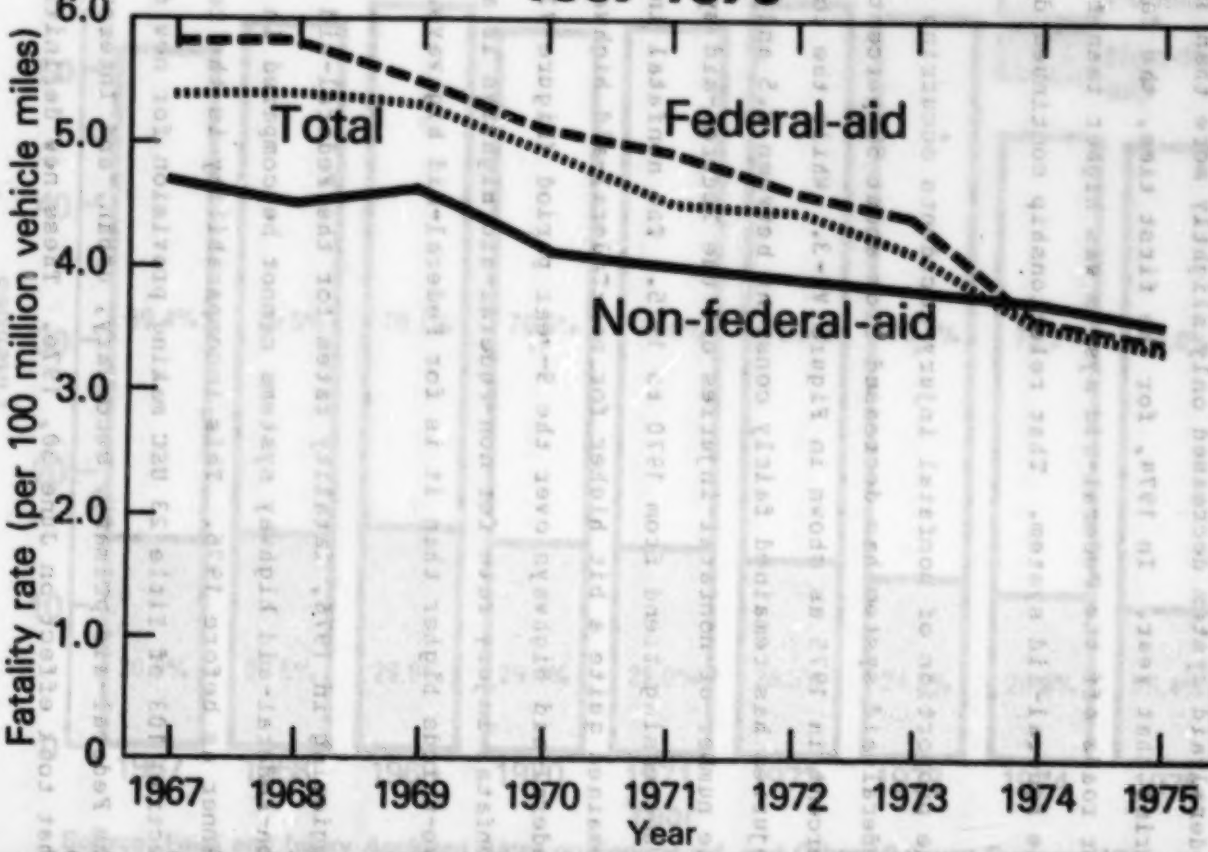
Fig. VI-2). By far, the largest percentage decrease on the Federal-aid system (18 percent) occurred in 1974 when the national 55 mph speed limit went into effect. The fatality rate off the Federal-aid system decreased only slightly more than 1 percent during that year. In 1974, for the first time, the fatality rate for roads off the Federal-aid system was higher than for roads on the Federal-aid system. That relationship continued during 1975.

The proportion of nonfatal injury accidents occurring off the Federal-aid system has decreased from about 50 percent in 1967 to 35 percent in 1975 as shown in Figure VI-3. While the total number of injuries has remained fairly constant between 2.5 and 2.8 million, the number of nonfatal injuries off the Federal-aid system has shown a decreasing trend from 1970 to 1975. The nonfatal injury rate has remained quite a bit higher for non-Federal-aid highways compared to Federal-aid highways over the 9-year period (Figure VI-4). The nonfatal injury rate for non-Federal-aid highways is about two-thirds higher than it is for Federal-aid highways.

Beginning in 1976, fatality rates for the Federal-aid and non-Federal-aid highway systems cannot be compared in the same manner as before 1976. This incomparability is the result of Section 103 of Title 23 USC making provision for new definitions for the Federal-aid primary, secondary, urban, and Interstate system that took effect on June 30, 1976. These new definitions describe a

FIGURE VI-2

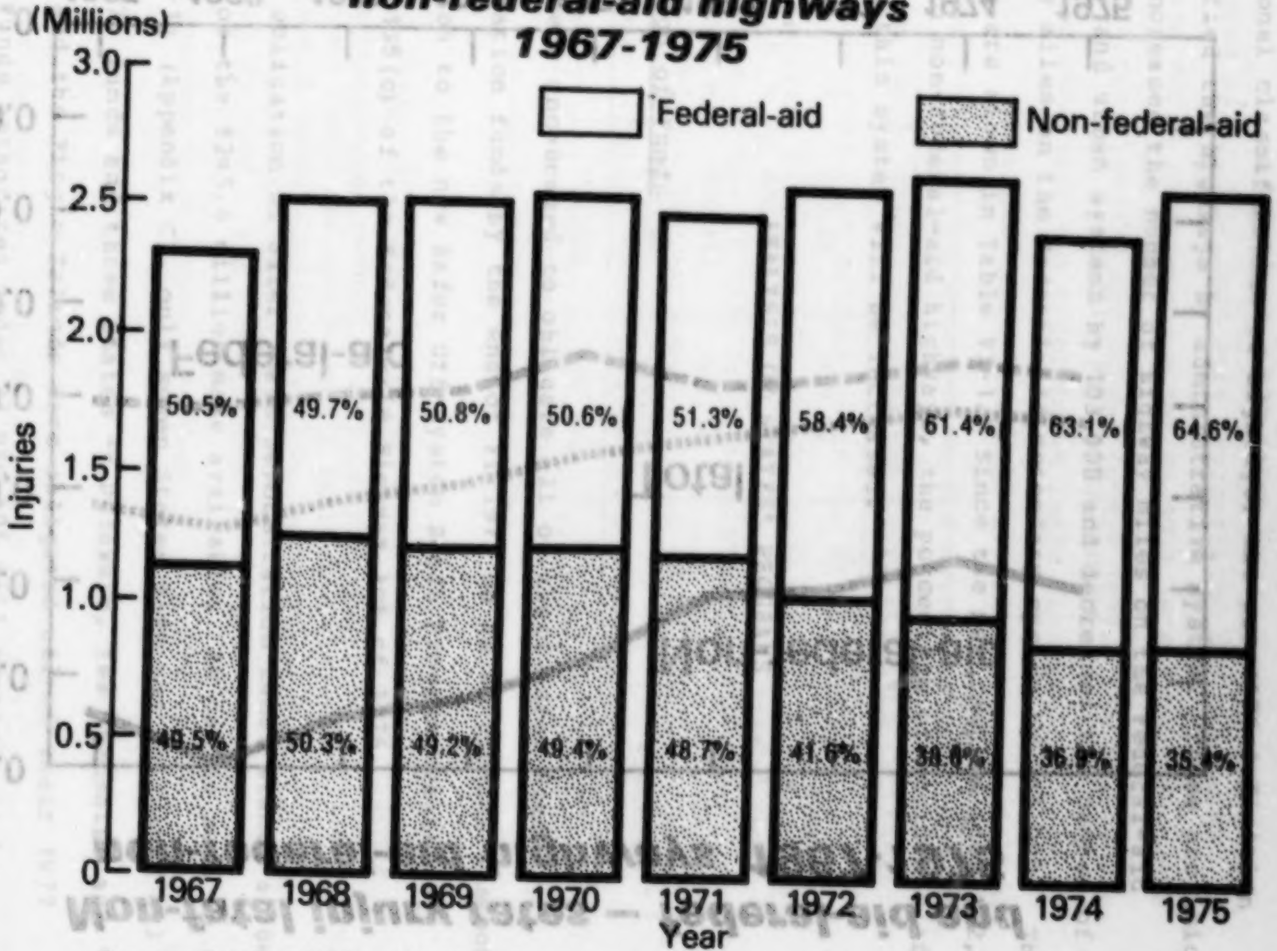
Fatality rates — federal-aid and non-federal-aid highways 1967-1975



Source: Fatal and Injury Accident Rates on Federal-aid and Other Highway Systems/1975,
U.S. DOT, FHWA

FIGURE VI-3

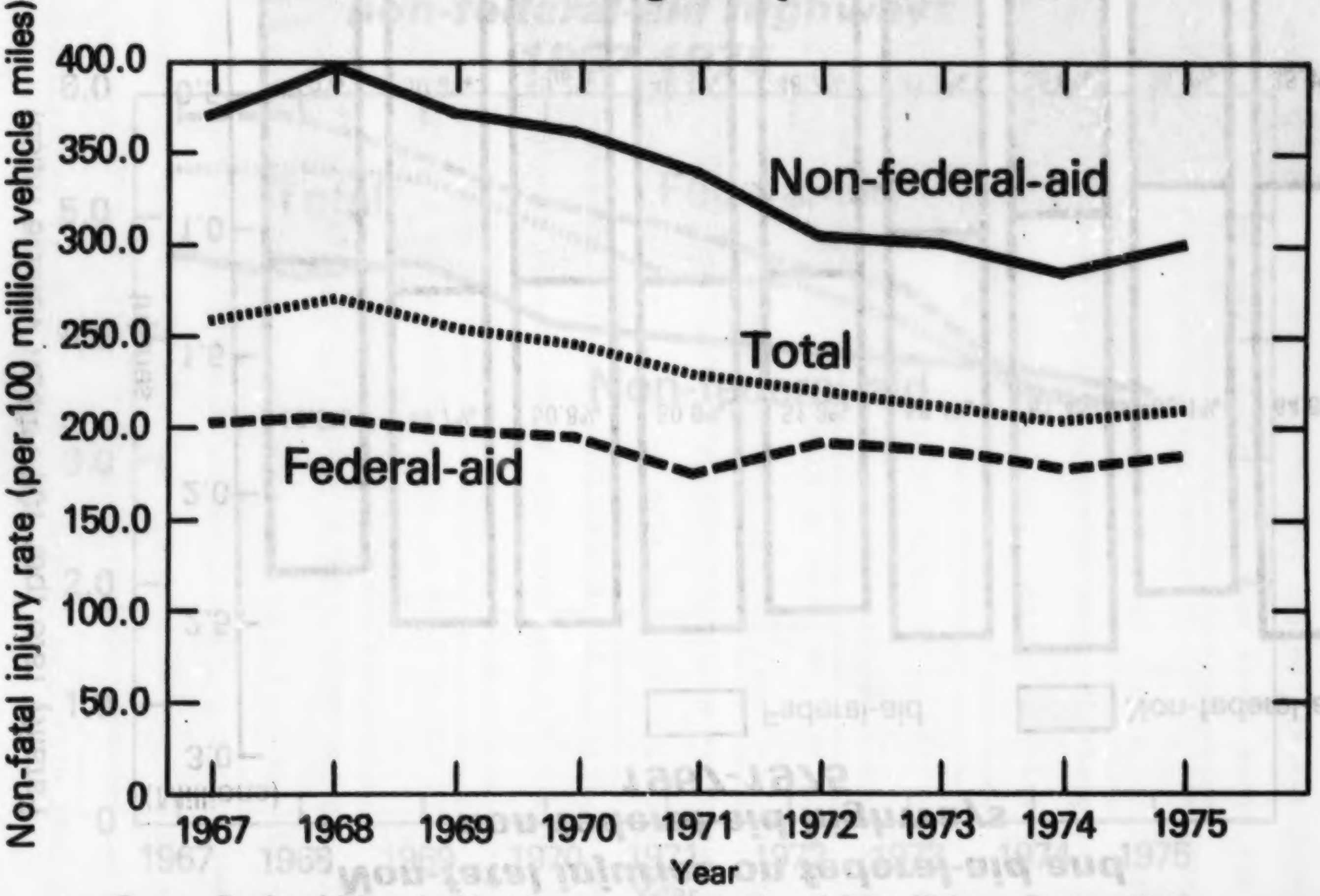
Non-fatal injuries on federal-aid and non-federal-aid highways 1967-1975



Source: Fatal and Injury Accident Rates on Federal-aid and Other Highway Systems/1975, U.S. DOT, FHWA

FIGURE VI-4

Non-fatal injury rates — federal-aid and non-federal-aid highways 1967-1975



Source: Fatal and Injury Accident Rates on Federal-aid and Other Highway Systems/1975, U.S. DOT, FHWA

functional classification of highways; the pre-1976 definition classified the highways by administrative system. These provisions have increased the number of highway miles on the Federal-aid primary and urban systems by 103,000 and decreased the number of highway miles on the Federal-aid secondary system by 245,000. These changes are shown in Table VI-1. Since the net results adds 142,000 miles to non-Federal-aid highways, the percentage of accidents after 1975 on this system will be increased.

ANALYSIS OF STATES' PROGRAMS

Obligation of Funds

States were encouraged to obligate all of their Safer Roads Demonstration funds by the end of FY 1977 so as to provide a smooth transition to the new Safer Off-System Roads Program created by Section 135(c) of the Federal-aid Highway Act of 1976.

Overall obligation of Safer Roads Demonstration funds stands at 84 percent of the $245.6 million made available. As can be seen in Table C-1g (Appendix C), only seven States have not obligated all their 1975 funds and three States -- Delaware, New Hampshire and Ohio -- and the Virgin Islands have obligated all of their 1977 funds. Funds authorized under 23 USC 405 will continue to be obligated until either completely obligated or lapsed on September 30, 1979.

TABLE VI-1

FEDERAL-AID SYSTEM MILEAGE

System	Mileage as of		
	12/31/75	12/31/76	Net Change
Interstate	42,858	43,059	+ 201
Other Primary	223,047	266,985	+ 43,938
Urban	65,160	124,003	+ 58,843
Secondary	643,221	398,330	- 244,891
TOTAL	974,286	832,377	- 141,909

Sources: Highway Statistics, Summary to 1975, U.S. Department of Transportation, Federal Highway Administration. National Functional System Mileage and Travel Summary, U.S. Department of Transportation, Federal Highway Administration, Office of Highway Planning, June 1977.

Two hundred million dollars were appropriated for the Safer Off-System Roads (SOS) program for FY 1977 in the 1977 Economic Stimulus Appropriations Act passed in May 1977. The States were advised in June that the apportioned funds were available for obligation. Since the funds were made available so late in the fiscal year, significant obligations did not begin until the last two months of the year. Further, the legislative history leading to this Act dictated that obligation of the FY 1977 SOS funds be administratively limited to those States which has obligated all their funds from the FY 1976 Off-System Roads program (Section 122 of the Federal-aid Highway Amendments of 1974). Only a few States were in this position when the SOS funds became available. Consequently, only four percent of the available funds were obligated, as can be seen in Table C-1h.

Table C-2e shows the distribution of Safer Roads Demonstration projects by cost range. Twenty-eight percent of total obligations, which included 34 percent of the projects to date, were for new projects in FY 1977. The average cost of FY 1977 projects was $39,900 compared to an overall average of $48,400, for the length of the program.

A summary of obligations by highway system for the three off-system programs can be found in Table VI-2. Detailed data for each program by State is included in Appendix C. Based on very limited

TABLE VI-2

OBLIGATIONS ($1000) FOR OFF-SYSTEM PROGRAMS AS OF SEPTEMBER 30, 1977

PROGRAM	HIGHWAY SYSTEM			
	STATE	LOCAL	COMBINED OR UNKNOWN	TOTAL
Safer Roads Demonstration	30,449 (14.7%)	131,328 (63.5%)	45,048 (21.8%)	206,825 (100.0%)
Off-System Roads (safety projects only)	4,483 (11.2%)	29,773 (74.3%)	5,836 (14.5%)	40,092 (100.0%)
Safer Off-System Roads (all projects)	2,480 (26.7%)	5,611 (60.3%)	1,209 (13.0%)	9,300 (100.0%)

obligations in the Safer Off-System Roads program, there has been a shift toward using a larger proportion of the total funds on State highways as compared to the two earlier off-system roads programs.

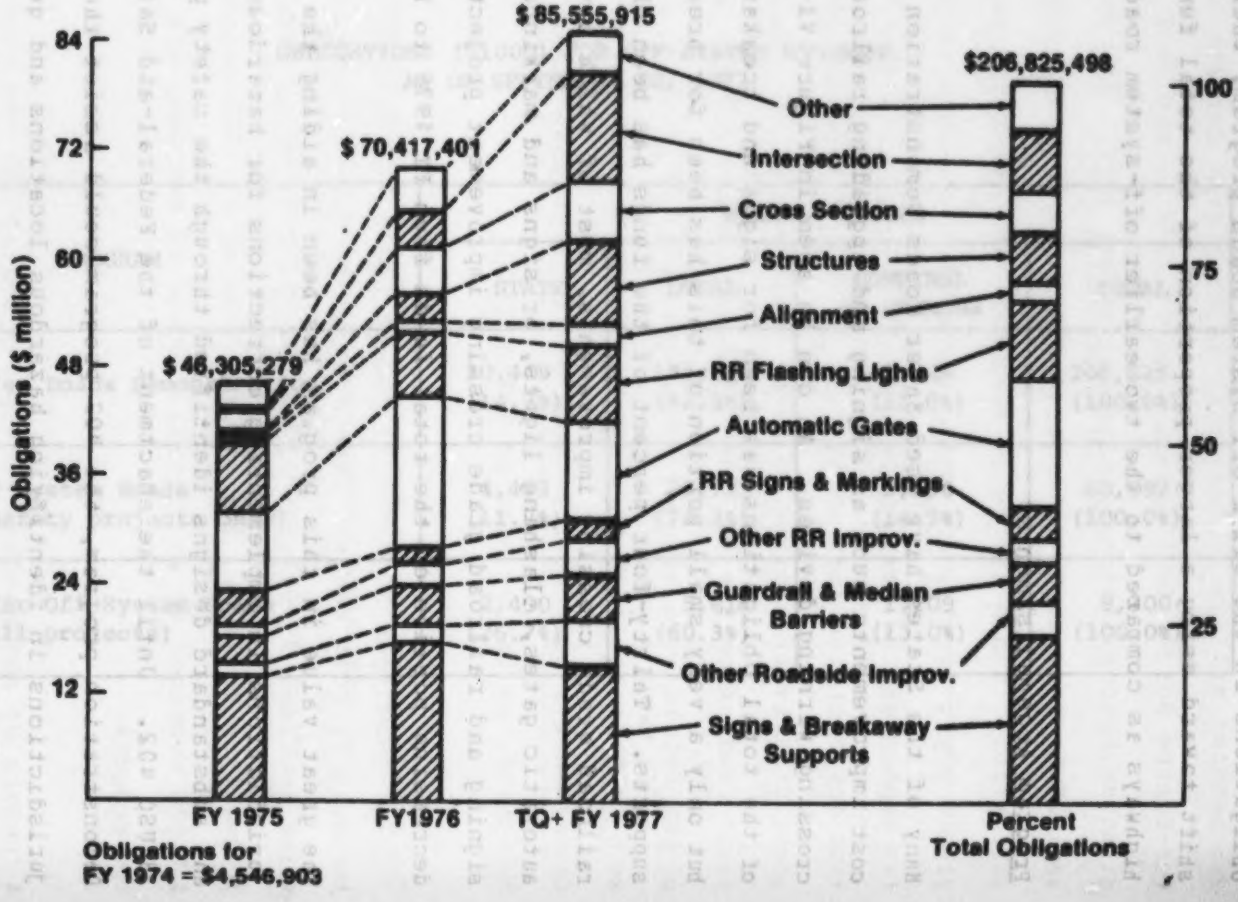
Program Accomplishments

Many of the States have used Safer Roads Demonstration funds for low cost improvements such as signing and upgrading railroad grade crossing warning devices. As can be seen in Figure VI-5, 23 percent of the total obligations has been for signs and breakaway supports but only a very small portion of this has been for breakaway supports. Thirty-four percent of the funds has been obligated for railroad grade crossing improvements, most of which have been for automatic gates, flashing lights, or signs and markings. Both signing and railroad grade crossing improvement projects have used a decreasing portion of the total funds from FY 1975 to FY 1977.

The great value in this program has been in aiding the local jurisdictions in implementing corrections for hazardous locations and substandard designs identified through the safety program under 23 USC 402. Until the enactment of the Federal-aid Safer Roads Demonstration program, the 402 program could assist the local jurisdictions in identifying hazardous locations and quantifying the extent of sign, signal and marking deficiencies. However, the States were precluded by 23 USC 402(g) from using these funds to correct most of the problems identified. Funding for the

FIGURE VI-5

Safer Roads Demonstration Program Distribution of Federal Funds By Construction Safety Classification



improvements by the local jurisdictions was provided with the enactment of 23 USC 405 in the Federal-aid Highway Safety Act of 1973.

Following are some examples of the uses which some States have made of the Safer Roads Demonstration funds. New Jersey has installed guardrails with breakaway cable terminals on county and local roads and installed signs and markings and rehabilitated crossing surfaces at railroad grade crossings. They have also purchased over 35,000 signs and 15,000 posts for 125 municipalities. The latter is a continuing program.

Florida used the funds for three categories of projects: (1) the installation of train-activated signals at high priority rail-highway grade crossings, (2) high priority safety improvements identified by areawide TOPICS studies, and (3) highway projects and roadside obstacles identified by county engineers as being high priority projects for safety improvements.

Missouri developed a priority system for each type of safety improvement. For railroad grade crossings, their order of priority was (1) upgrade passive warning devices to meet the requirements of the MUTCD, (2) upgrade warning devices based on accident experience, and (3) upgrade warning devices based on benefit/cost ratio. High hazard locations were improved based on the number of accidents occurring during a 12-month period. Citywide signing projects were developed to bring all signs into conformance with the MUTCD. One hundred thirty such projects have been authorized for local jurisdictions in Missouri.

Program Analysis

With passage of the 1976 Federal-aid Highway Act, the Safer Roads Demonstration program was essentially combined with the old Section 219 Off-System Roads program into the Safer Off-System Roads program. An analysis of the Off System Roads program shows that one-fourth of the $159.8 million obligated was used for safety projects coded as safety. A majority of the remaining funds were obligated for bridge and resurfacing projects which are relatively high cost projects with relatively low safety benefits.

Nearly one-half of the limited ($9.3 million) Safer Off-System Roads funds that were obligated by September 30, 1977 were for work coded as safety projects. It is too early to tell if this proportion of Safer Off-System Roads funds will continue to be obligated for safety projects or if the proportion will decrease to or below the level of old 23 USC 219 program. Taking into account the fact that funds are now specifically appropriated for rail-highway grade crossing improvements off the Federal-aid system, nearly 40 percent of the Safer Off-System Roads funds need to be obligated for safety projects off the Federal-aid system to keep funding at the FY 1976 level.

VII. OTHER HIGHWAY SAFETY ACTIVITIES

The safety construction programs of the 1973 and 1976 Highway Acts are high impact safety improvement programs; however, in terms of the total Federal and State safety effort, they are just one component. Other essential elements are discussed briefly below.

SKID ACCIDENT REDUCTION PROGRAM

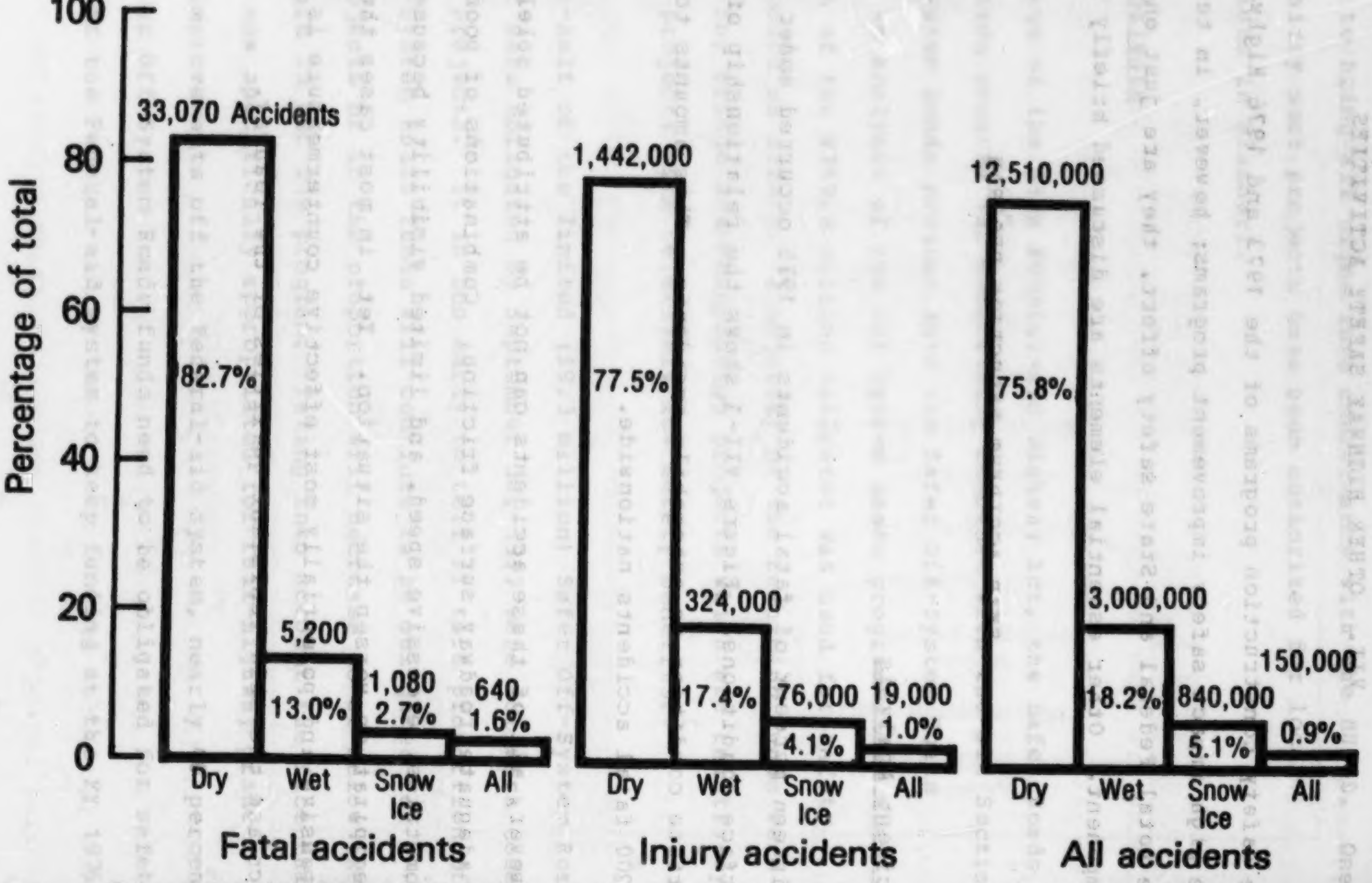
Accident Analysis

Thirteen percent of fatal accidents in 1975 occurred under wet surface conditions. Figure VII-1 shows the relationship of road surface condition to automobile accidents. This amounts to nearly 5,200 fatal accidents nationwide.

However, all of these accidents can not be attributed solely to lack of adequate roadway surface friction. Combinations of poor geometrics, excessive speed, and limited visibility because of precipitation worsen the situation. Yet, in most cases the least expensive and potentially most effective countermeasure is to increase the skid resistant qualities of the roadway.

FIGURE VII-1

Condition of Road Surface
Motor Vehicle Traffic Accidents - 1975



Source: Accident Facts, 1976 Edition, National Safety Council

Development and Implementation of Improvements

The process for correcting skid prone locations is similar to that for the high-hazard/roadside obstacle programs. Table 6 of Appendix B shows the various factors used by States in developing projects and setting priorities. Most States use some combination of accident experience e.g. total or wet weather accidents and physical conditions such as geometrics or skid number to rank projects. Several States incorporate the skid accident reduction program directly into their high-hazard location program.

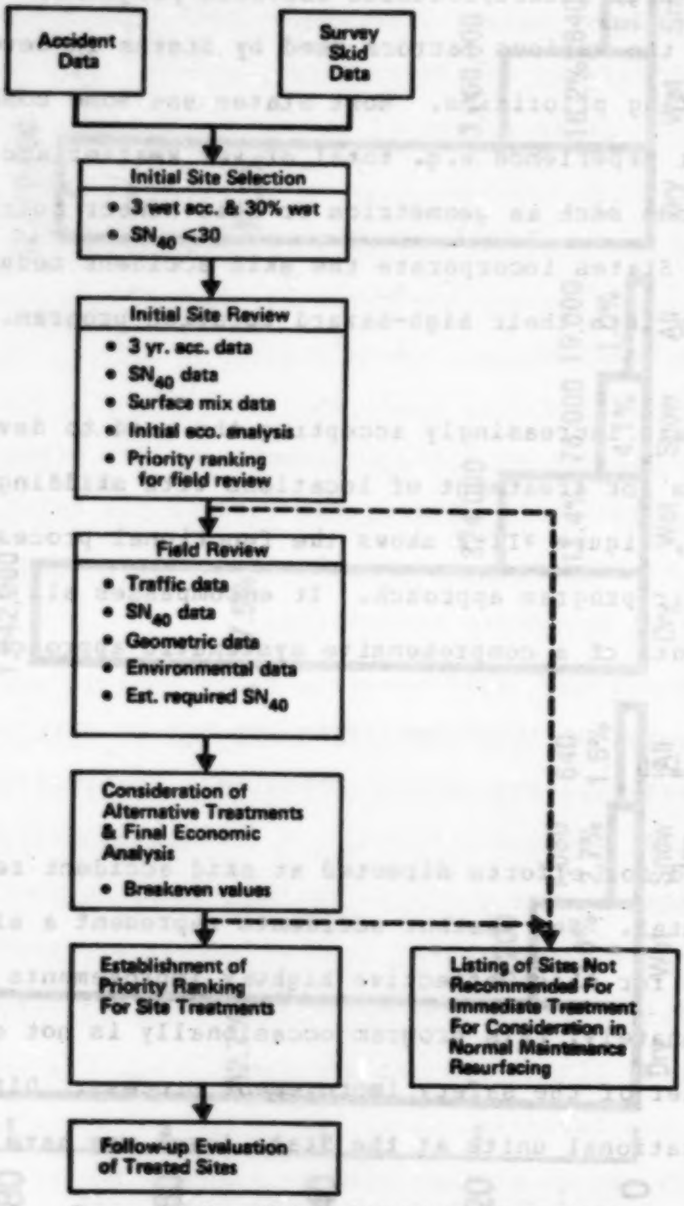
States are increasingly accepting the need to develop systematic programs for treatment of locations with skidding accidents. As an example, Figure VII-2 shows the functional process used by Virginia for their program approach. It encompasses all of the necessary components of a comprehensive systematic approach.

Evaluation

The need for efforts directed at skid accident reduction is well documented. Wet weather accidents represent a significant accident problem for which effective highway improvements exist. Unfortunately, this program occasionally is not coordinated with the remainder of the safety improvement process. Different organizational units at the State level may have this

FIGURE VII-2

Virginia - Wet pavement accident reduction program.


Accident Data
Survey Skid Data
Initial Site Selection
• 3 wet acc. & 30% wet
• SN40 <30
Initial Site Review
• 3 yr. acc. data
• SN40 data
• Surface mix data
• Initial eco. analysis
• Priority ranking for field review
Field Review
• Traffic data
• SN40 data
• Geometric data
• Environmental data
• Est. required SN40
Consideration of Alternative Treatments & Final Economic Analysis
• Breakeven values
Establishment of Priority Ranking For Site Treatments
Listing of Sites Not Recommended For Immediate Treatment For Consideration in Normal Maintenance Resurfacing
Follow-up Evaluation of Treated Sites

Source: Rankie and Mahone, "Virginia's Wet Pavement Accident Reduction Program" Transportation Research Record Number 623.

responsibility, thus hampering coordinated action. The skid accident reduction program must be a key part of a State's unified process for safety improvement.

NARROW BRIDGES

Accident Analysis

Safety deficiencies of highway bridges have received a great deal of public attention. Much of this attention is directed at structural integrity rather than vehicular operational safety. Bridges which do not have adequate width for safe operation are "built-in" roadway hazards just as rail-highway grade crossings or roadside obstacles are.

Compared to the attention given to the collection of rail-highway grade crossing accident data, the collection of bridge accident data is in its infancy.

Little quantification of operational problems on narrow bridges has taken place, even though the number of fatalities involving a bridge exceeds the number involving grade crossings. For example, over three times as many fatal accidents were associated with bridge crashes than with train crashes in North Carolina in 1976. Sixty fatal accidents involved bridges or underpasses while only 18 involved railroad trains. The same trend is more pronounced when considering all accidents, where bridges and trains were involved in 2,250 and 307, respectively. Of course it can not be said that all bridges were "narrow" but then neither can it be said that all rail-highway crossings were "inadequately" signed and marked. The same relationships existed in Oregon in 1975. Of a total of 502 fatal accidents 23 occurred at bridges and 3 at railroad crossings.

Development and Implementation of Improvements

Narrow bridges are usually treated through the high-hazard or roadside obstacle program as indicated in Table 6 of Appendix B. However, some States maintain separate programs for this type of hazard.

While the cost to replace narrow bridges may be prohibitive, especially if no structural deficiency exists, lower cost interim treatments, such as signing, markings, and barriers to protect motorists, do exist. When bridges are replaced with new structures, operational deficiencies must be of as great a concern as is structural integrity. Care must be taken so that future operational problems are not created.

Evaluation

The identification and treatment of narrow bridge hazards offer an opportunity for coordinated, effective safety improvements at the Federal, State, and local levels. Accident experience at individual locations may not be adequate to identify a narrow bridge as a high accident location. Yet taken as a class with the low cost treatments available, this may provide an opportunity for a cost-effective countermeasure. Just as the skid program sometimes is not coordinated with the remainder of the process for safety improvement, bridge problems are often viewed by some States as solely within the purview of the bridge engineer.

402 ACTIVITY SUPPORT OF SAFETY CONSTRUCTION PROGRAMS

In July 1977, the Department of Transportation completed the report "Evaluation of the Highway Safety Programs." One of the principle recommendations of that report was that closer coordination of activities under 23 USC 402 and the safety construction programs would have a mutually beneficial effect. Because "402" activities, if properly administered, can supply the planning and evaluation capabilities, while safety construction programs can fund the implementation, they are complementary programs.

This relationship has already begun to grow at both State and local levels. Figure VII-3 shows the planned obligation of "402" funds since passage of the 1973 safety construction programs. There has been a definite shift in funding to the inventory of high accident locations which drive many construction programs. Provision of traffic engineering services, especially to local agencies, is a necessary ingredient to implementation of highway improvements on their road systems.

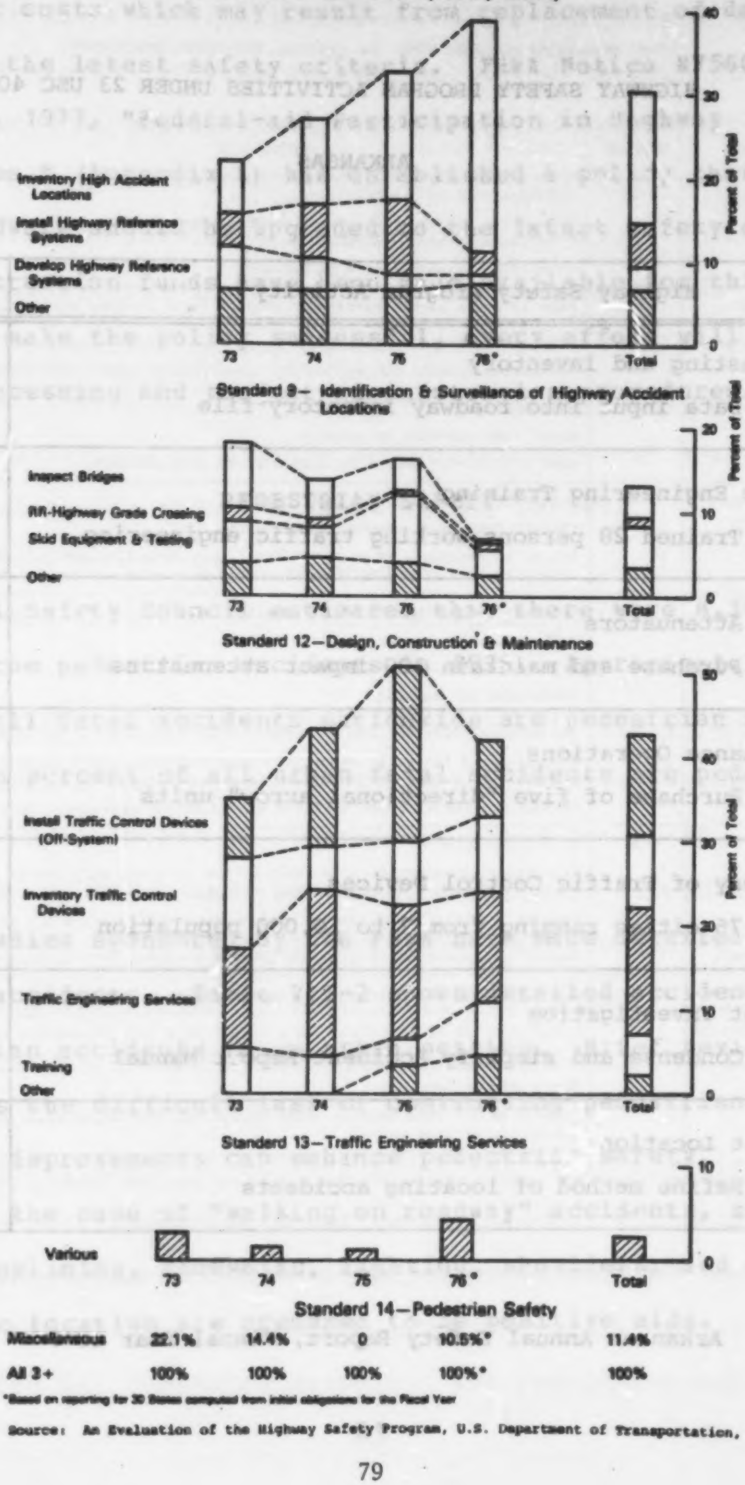
Most States reported the usefulness of the "402" program as support for safety construction. Examples of activities given by the States were varied. Table VII-1 summarizes information supplied by the State of Arkansas.

Improvements in Safety Maintenance

Accident damaged roadway hardware is usually replaced in-kind rather than to current safety standards. For instance, if a section of guardrail is damaged, frequently only the damaged section is replaced rather than upgrading the entire length. This may be done in order to keep replacement costs to a minimum. In some cases items damaged beyond repair, such as a damaged roadside light support, are replaced in-kind because of a perceived lower cost of replacement. In addition, insurance and liability considerations lead some States to replacement with less than current designs.

FIGURE VII-3

Distribution of "402" Funds by Safety Activity



*Based on reporting for 30 States computed from initial obligations for the Fiscal Year

Source: An Evaluation of the Highway Safety Program, U.S. Department of Transportation, July 1977.

TABLE VII-1

HIGHWAY SAFETY PROGRAM ACTIVITIES UNDER 23 USC 402

ARKANSAS

Highway Safety Program Activity	Cost
Skid Testing and Inventory - Data input into roadway inventory file	$ 18,250
Traffic Engineering Training - Trained 28 persons working traffic engineering	$ 17,309
Impact Attenuators - Purchase and maintain 300 impact attenuators	$ 49,440
Maintenance Operations - Purchase of five "directional arrow" units	$ 10,000
Inventory of Traffic Control Devices - 76 cities ranging from 2 to 10,000 population	$ 38,466
Accident Investigation - Condense and simplify Accident Report Manual	$ 4,177
Accident Location - Refine method of locating accidents	$ 65,182

Source: Arkansas Annual Safety Report, Fiscal Year 1977.

FHWA has recently taken action to overcome the States reluctance to incur higher costs which may result from replacement of damaged hardware to the latest safety criteria. FHWA Notice N7560.4, dated November 17, 1977, "Federal-aid Participation in Highway Appurtenances," (Appendix A) has established a policy that highway damaged hardware should be upgraded to the latest safety design. Safety construction funds have been made available for this purpose. In order to make the policy successful, every effort will be made to simplify processing and project administration procedures.

PEDESTRIAN SAFETY

The National Safety Council estimates that there were 8,300 deaths resulting from pedestrian accidents in 1976. Approximately 20 percent of all fatal accidents nationwide are pedestrian accidents. Thirty-seven percent of all urban fatal accidents are pedestrian related.

Research studies sponsored by the FHWA have made detailed studies of pedestrian accidents. Table VII-2 shows detailed accident analysis for pedestrian accidents in an urban setting. Brief review of the data reveals the difficult task of controlling pedestrian behavior. Yet highway improvements can enhance pedestrian safety. For example, in the case of "walking on roadway" accidents, signing and marking, edgelining, sidewalks, lighting, shoulders, and barriers in high traffic location are presumed to be positive aids.

TABLE VII-2

URBAN PEDESTRIAN ACCIDENT TYPES AND CRITICAL BEHAVIORAL DESCRIPTORS

TYPE OF ACCIDENT	PERCENT*	DESCRIPTION
Dart-Out (First Half)	23	Midblock (not at intersection). Pedestrian sudden appearance and short time exposure (driver does not have time to react to avoid collision). Pedestrian crossed less than halfway.
Dart-Out (Second Half)	9	Same as above except pedestrian gets at least halfway across before being struck.
Midblock Dash	7	Midblock (not at intersection). Pedestrian running but not sudden appearance or short time exposure as above.
Intersection Dash	12	Intersection. Short time exposure or running. Same as Dart-Out except it occurs at an intersection.
Vehicle Turn-Merge With Attention Conflict	4	Intersection or vehicle merge location. Vehicle turning or merging into traffic. Driver is attending to auto traffic in one direction and collides with pedestrian located in a different direction than that of the driver's attention.
Turning Vehicle	5	Intersection or vehicle merge location. Vehicle turning or merging into traffic. Driver attention not documented. Pedestrian not running.
Multiple Threat	3	One or more vehicles stop in traffic lane (e.g. Lane 1) for pedestrian. Pedestrian is hit as he steps into next parallel same direction traffic lane (e.g. Lane 2) by a vehicle moving in the same direction as the vehicle that stopped. Collision vehicle driver's vision of pedestrian obstructed by the stopped vehicle.
Bus Stop Related	2	At a bus stop. Pedestrian steps out from in front of bus at a bus stop and is struck by vehicle moving in same direction as bus while passing bus. Same as Multiple Threat except that stopped vehicle is a bus at a bus stop.
Vendor-Ice Cream Truck	2	Pedestrian struck while going to or from a vendor in a vehicle on the street.
Disabled Vehicle Related	11	Pedestrian struck while working on or next to a disabled vehicle.
Result of Vehicle-Vehicle Crash	3	Pedestrian hit by vehicle(s) as a result of a vehicle-vehicle collision.
Trapped	1	Signalized intersection. Pedestrian hit when traffic light turned red (for pedestrian) and cross traffic vehicles started moving.

*Percentages indicated are from recent research studies of urban pedestrian accidents (Snyder & Knoblauch, 1971; Knoblauch, 1975).

Source: Model Pedestrian Safety Program, U.S. Department of Transportation, Federal Highway Administration, October 1977

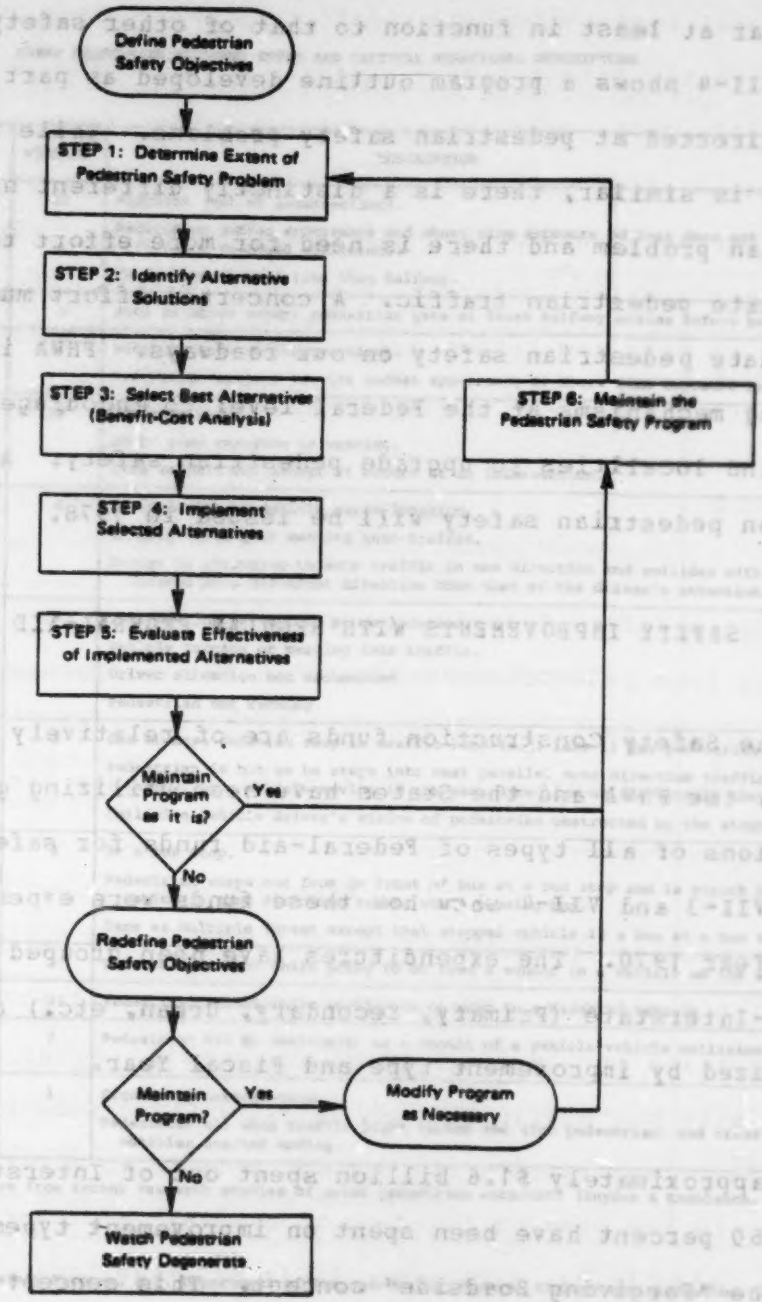
The suggested approach to pedestrian safety program implementation is similar at least in function to that of other safety problems. Figure VII-4 shows a program outline developed as part of a user's manual directed at pedestrian safety problems. While the functional approach is similar, there is a distinctly different nature to the pedestrian problem and there is need for more effort to safely accommodate pedestrian traffic. A concerted effort must be made to accommodate pedestrian safety on our roadways. FHWA is currently exploring mechanisms at the Federal level to encourage and assist States and localities to upgrade pedestrian safety. A revised policy on pedestrian safety will be issued in 1978.

SAFETY IMPROVEMENTS WITH REGULAR FEDERAL-AID FUNDS

While the Safety Construction funds are of relatively recent vintage, the FHWA and the States have been utilizing growing proportions of all types of Federal-aid funds for safety work. Tables VII-3 and VII-4 show how these funds were expended since Fiscal Year 1970. The expenditures have been grouped by Interstate and non-Interstate (Primary, Secondary, Urban, etc.) and are categorized by improvement type and Fiscal Year.

Of the approximately $1.6 billion spent out of Interstate funds, almost 60 percent have been spent on improvement types encouraged under the "Forgiving Roadside" concept. This concept promotes the correction of roadside appurtenances including the installation of breakaway sign and luminaire supports, and impact attenuators. This

FIGURE VII-4


Define Pedestrian Safety Objectives
STEP 1: Determine Extent of Pedestrian Safety Problem
STEP 2: Identify Alternative Solutions
STEP 3: Select Best Alternatives (Benefit-Cost Analysis)
STEP 4: Implement Selected Alternatives
STEP 5: Evaluate Effectiveness of Implemented Alternatives
Maintain Program as it is?
Yes
No
Redefine Pedestrian Safety Objectives
Maintain Program?
Yes
Modify Program as Necessary
No
Watch Pedestrian Safety Degenerate
STEP 6: Maintain the Pedestrian Safety Program

Model Pedestrian Safety Program Outline

Source: Model Pedestrian Safety Program, U.S. Department of Transportation, Federal Highway Administration, October 1977.

TABLE VII-3

SAFETY WORK WITH NON-SAFETY FUNDS (INTERSTATE)
AS OF SEPTEMBER 30, 1977
($1000)

Fiscal Year	Intersection	Cross Section	Structures	Alignment	Railroad Grade Crossing	Roadside Appurtenance	Other	Total
1970	732.1	2,903.1	1,664.7	2,510.6	15.8	38,591.7	16,538.9	62,956.9
1971	100.9	16,571.0	2,619.7	252.8	10.9	34,555.7	19,819.2	73,930.2
1972	2,660.4	80,409.0	4,638.3	2,257.7	2,785.2	68.184.6	37,938.9	198,874.1
1973	2,013.1	18,464.0	5,795.3	302.4	0	43,482.6	32,233.6	102,291.0
1974	2,984.2	40,623.8	11,256.9	115.4	62.0	53,772.8	31,333.6	140,148.7
1975	8,124.2	111,653.1	26,341.2	2,773.0	1,609.0	101,804.8	72,537.0	324,842.3
1976	2,740.3	57,998.7	44,199.3	18,469.2	1,869.8	49,087.2	59,516.5	233,881.0
TQ	551.4	18,081.1	13,256.0	758.0	120.6	13,675.1	20,405.9	66,848.3
1977	4,579.0	96,479.9	67,495.7	11,829.5	4,045.1	91,383.6	101,978.6	377,791.4
1970-1977	24,485.5	443,183.7	177,267.1	39,268.7	10,518.3	494,538.3	392,302.3	1,581,563.9
	(1.5%)	(28.0%)	(11.2%)	(2.5%)	(0.7%)	(31.3%)	(24.8%)	(100%)

TABLE VII-4

SAFETY WORK WITH NON-SAFETY FUNDS (NON-INTERSTATE)
AS OF SEPTEMBER 30, 1977
($1000)

Fiscal Year	Intersection	Cross Section	Structures	Alignment	Railroad Grade Crossing	Roadside Appurtenance	Other	Total
1970	5,955.2	16,667.7	12,915.4	12,559.0	4,225.4	5,420.8	2,425.1	60,168.6
1971	4,919.6	8,953.3	8,238.4	10,228.8	2,580.1	2,947.1	1,368.8	39,236.1
1972	34,936.8	33,746.3	35,534.2	11,144.3	34,571.7	14,945.4	11,258.1	176,136.8
1973	23,836.2	16,273.8	20,820.1	3,079.4	43,627.5	7,814.4	8,720.5	124,171.9
1974	25,955.5	26,727.9	26,013.7	10,162.1	11,219.8	8,482.0	3,103.7	111,664.7
1975	53,428.5	129,984.8	92,783.1	13,123.3	22,429.2	28,877.8	18,817.2	359,443.9
1976	55,921.5	170,559.8	128,032.7	19,347.8	19,193.9	22,097.1	12,954.4	428,107.2
TQ	14,732.7	62,342.2	43,828.6	5,975.9	6,165.6	11,083.7	20,458.9	164,587.6
1977	102,184.0	202,860.7	240,351.0	25,436.0	57,887.3	46,076.5	45,527.6	720,323.1
1970-1977	321,870.0 (14.7%)	668,116.5 (30.6%)	608,517.2 (27.9%)	111,056.6 (5.1%)	201,900.5 (9.2%)	147,744.8 (6.8%)	124,634.3 (5.7%)	2,183,839.9 (100%)

type of project comprised 31 percent of the obligations. Cross section projects used 28 percent of the obligations. These included shoulder widening or improvements, and clearing or flattening side slopes.

Of the Federal-aid funds expended off-the-Interstate system since 1970, $2.2 billion have been spent on safety work. For this type of safety work, cross-section projects and structures projects used the largest amounts of funds.

In the case of both Interstate and non-interstate funding, safety-related expenditures have accelerated dramatically in recent years. Interstate safety expenditures are six times the 1970 level. Non-interstate Federal-aid safety improvements are at a dollar level twelve times the 1970 level. Taking the effects of inflation into account this is equivalent to 3 1/2 and 7 times the respective 1970 levels of expenditure.

SAFETY TRAINING

Approximately 110 engineers and safety managers were trained in modern safety management techniques during this reporting period. The training was accomplished in the facilities at the Transportation Safety Institute (TSI) in Oklahoma City, Oklahoma. The training classes included safety management personnel from FHWA, State, and local highway agencies.

A graduate level study program, with special emphasis on traffic safety management, is being developed under contract to FHWA. The course is intended for those engineers and managers granted special safety fellowships under the Federal Highway Administration's Fellowship Program in Highway Safety and Transportation. The initial training begins in January 1978.

A course on traffic control for street and highway construction and maintenance operations was developed for FHWA by a contractor. The objectives of this course are to assist participants in identifying and applying workable concepts for planning, designing, installing, maintaining, and monitoring traffic control in construction and maintenance areas. Seventeen classes of approximately 30 each were trained during the TQ and FY 1977.

A course on pedestrian and bicycle consideration in urban areas was developed for individuals engaged in planning, designing, and traffic engineering activities associated with pedestrian and bicycle traffic. Presentations of this course began in 1977 and will continue through 1978.

"Safety Design and Operational Practices for Streets and Highways" is a course developed to provide a practical approach to the application of traffic safety in the design and operations of streets and highways. Three pilot courses were presented in the summer of 1977 and regular presentations are scheduled to begin February 1978.

VIII. EVALUATION OF HIGHWAY SAFETY PROGRAMS AND PROJECTS

The success of highway safety programs will continue to be judged by reductions in the number and severity of highway traffic accidents. The objective of the State highway safety programs approved by the Secretary under 23 USC 402 is "the reduction of traffic accidents and deaths including injuries and property damage resulting therefrom." In addition, FHWA policy is to "further reduce highway hazards and the resulting number and severity of accidents on all the Nation's highways." Safety construction funds are directed at improving high accident or potentially high accident locations, eliminating hazardous roadside obstacles or protecting errant vehicles from them, as well as other related safety activities.

Even though accident reduction seems to be a clear measure of accomplishment, the change in numbers of traffic accidents or fatalities, or in accident rates may not be a reliable, straightforward analysis tool. As demonstrated in many of the previous accident analysis sections of the report, the definition of safety problems by accident experience in some cases is tenuous. A situation that may appear hazardous to an observer may not have a correspondingly high accident experience. Similarly, what may appear to be a good safety improvement project based on objective criteria may not show reductions in accidents. In other words, because traffic accidents are relatively rare occurrences and sensitive to a wide range of variable factors, there is a possibility of either determining an improvement to be effective when it is not or determining it is not effective when actually it is. Much of this uncertainty can be overcome by more rigorous analytical and statistical testing. Lack of precision or standard definitions on the part of the data itself will also contribute unreliability. Grouping, or aggregating, accident and highway data from a number of locations is a method to improve analytical reliability. Other analysis techniques can be used including:

- o Analysis of accident rates (accidents per vehicle mile of travel, per number of vehicles passing a point, or per highway mile).
- o Comparison of treated versus similar untreated locations (control locations).
- o Utilization of statistical tests to determine normal or abnormal accident fluctuation.
- o Comparison of types of accidents for specific improvements (e.g., run-off-the-road for pavement edgelining, or wet weather accidents for skid treatments).

Even with the improved reliability that greater detail and sophistication can provide, collection of highly detailed accident and evaluation data at the national level would not be the best investment of scarce resources. It must be remembered each additional data item collected or analysis capability developed requires a substantial investment of financial and manpower resources. While it is desirable to have the most accurate, detailed information possible, consideration of data gathering and analysis costs dictate variable levels of evaluation, sophistication, and comprehensiveness. For instance, a highway safety engineer would need detailed, localized evaluation results when considering an improvement to a high accident location. On the other hand, decisionmakers at the Federal level need generalized, nationally applicable evaluation results when considering Federal funding options. To aggregate detailed, localized evaluation results on a national level would be an unnecessary and wasteful burden on Federal, State, and local governments.

The first part of the overall FHWA evaluation plan strives to evaluate the safety construction programs in line with legislative requirements providing necessary information to Federal decisionmakers. Utilizing the straightforward "before-and-after" evaluation technique, data is gathered on the numbers of accidents by severity and traffic volumes. Based on these data and other supplemental information, analysis is made of the safety effectiveness of the various funding programs and improvement types. These results are presented in the first section of this chapter.

The second part of the FHWA evaluation plan consists of more specific, detailed evaluations that are necessary for program and project decisions made at the State and local levels. The factors to be considered and the methods to be used vary widely, and FHWA, through assistance provided by its division offices and a comprehensive nationwide training effort, is promoting the development of safety effectiveness evaluation capabilities. It is the goal of the efforts to raise the awareness in all States of the need to perform detailed evaluations as adjuncts to their own safety program efforts. Examples of State evaluations are presented in the second section of this chapter.

SECTION I - PROGRAM AND PROJECT EVALUATION

Only approximately one-half of the States submitted usable accident and cost data for the separate safety programs. To fulfill the legislative requirements and provide necessary information, the Federal Highway Administration has requested that States submit cost and accident data on completed highway projects as input into a nationwide evaluation. Table VIII-1 shows States submitting usable data for evaluating each of the safety programs. In some States the lack of an accident data system that can readily retrieve accident data for a specific location or section of highway may be a reason for the poor reporting. In some cases sufficient time has not elapsed for "after" accident data to accumulate since the completion of a safety improvement project (at least 1 year).

TABLE VIII-1

SUMMARY OF STATES' EVALUATION DATA

Safety Program or Funding Source	Number of States' Data Used In Evaluation	States With 10% or More Funds In Category
Rail-Highway Crossingss	25	Tex. (32%), Calif. (18%)
High Hazard Locations	37	Calif. (26%), Ill. (26%), Pa. (13%)
Roadside Obstacles	26	Calif. (25%), Ariz. (16%)
Safer Roads Demonstration	19	Calif. (40%), Ga. (24%)
Interstate	23	Ariz. (22%), Fla. (13%), N.H. (10%), Wis. (10%)
Other Federal-aid	26	Me. (28%), Colo. (11%)
State and Local	23	Wis. (29%), Pa. (12%), Ga. (11%)

Because of this lack of comprehensive reporting, a few States' data dominate . Those States that contributed data for at least 10 percent of the total cost of project evaluated in a particular category are shown in Table VIII-1.

Analysis results in Tables VIII-2, VIII-4, and VIII-7 are expressed in terms of percent reduction in annual accidents by severity and in terms of annual cost per accident reduced by severity. Percent reductions represent the difference between an "average year before" the highway improvement and an "average year after" the improvement was made. For determining annual cost per accident reduced, each type of project was given a service life based on its safety classification code. The codes and service lives are listed in Table VIII-3. To complete the calculation, an interest rate of 10 percent was used, and a zero dollar salvage was assumed. From these assumptions a capital recovery factor was found which determines the annual cost of constructing the highway improvements. While the analysis appears very detailed, the national scope of the evaluation precluded consideration of some important factors. Not taken into account were changes in traffic volumes and speed between the time periods before and after the highway improvements were made. Additional site specific information such as rural or urban environment and functional type of the highway improvements were not considered in the results.

In addition, the data analyzed represents the safety payoff of only

TABLE VIII-2

COST AND BENEFIT SUMMARY BY SOURCE OF FUNDS

Safety Program or Funding Source	Total Cost of Evaluated Improvements ($1000)	Average Annual Accidents								Annual Cost per Accident Reduced ($1000)		
		Before Improvements				*Percent Reduction After Improvements						
		Fatal	Injury	P.D.O.	Total	Fatal	Injury	P.D.O.	Total	Fatal	Fatal + Injury	Total
Rail-Highway Crossings	19,691	44	227	289	560	36	17	12	16	200	58	36
High Hazard Locations	42,030	89	3,060	6,735	9,884	27	15	19	18	273	14	4
Roadside Obstacles	10,232	29	598	1,208	1,835	-52	-6NS	2NS	-2NS	-	-	-
Safer Roads Demonstration	11,470	82	2,584	6,922	9,588	24	2NS	4	4	92	-	5
Total - Safety Construction Programs	83,423	244	6,469	15,154	21,867	18	8	11	10	292	23	6
Interstate Safety	95,266	145	3,868	7,434	11,447	28	7	2NS	4	313	42	31
Safety Improvements With Other Federal-aid Funds	73,408	22	1,712	3,810	5,544	-5NS	12	10	11	-	47	16
Total - Federal-aid	252,097	411	12,049	26,398	38,858	21	8	8	8	418	33	11
State and Local Funds	57,944	125	3,242	6,941	10,308	38	11	9	10	199	24	9
TOTAL	310,041	536	15,291	33,339	49,166	25	9	8	9	339	31	11

*Minus numbers indicate increase in accidents; NS - No significant change at 95% level of confidence.

P.D.O. = Property damage only

TABLE VIII-3

SAFETY IMPROVEMENT PROJECT CODES, DESCRIPTIONS, AND SERVICE LIVES USED IN EFFECTIVENESS EVALUATION

Code	Description	Service Life (Years)
	Intersection Projects	
10	Channelization, left-turn bay	10
11	Traffic signals	10
12	Combination of 10 and 11	10
13	Sight distance improved	10
19	Other intersection, except structures	10
1A	Combination of 10 and 19	10
1B	Combination of 11, 13, 19, 65	10
	Cross Section Projects	
20	Pavement widening, no lanes added	20
21	Lanes added without new median	20
22	Highway divided, new median added	20
23	Shoulder widening or improvement	20
24	Combination of 20-23	20
25	Skid treatment - grooving	10
26	Skid treatment - overlay	10
27	Flattening, clearing side slopes	20
29	Other cross section or combinations of 20-27	20
2A	Combination of 20 and 26	15
	Structures	
30	Widening bridge or major structure	20
31	Replace bridge or major structure	30
32	New bridge or major structure (except 34 and 51)	30
33	Minor structure	20
34	Pedestrian over- or under-crossing	30
39	Other structure	20
	Alignment Projects	
40	Horizontal alignment changes (except 52)	20
41	Vertical alignment changes	20
42	Combination of 40 and 41	20
49	Other alignments	20
	Railroad Grade Crossing Projects	
50	Flashing lights replacing signs	10
51	Elimination by new or reconstructed grade separation	30
*52	Elimination by relocation of highway or railroad	30
*53	Illumination	10
54	Flashing lights replacing active devices	10
55	Automatic gates replacing signs	10
56	Automatic gates replacing active devices	10
57	Signing, marking	10
58	Crossing surface improvement	10
59	Other RR grade crossing	10
5A	Any combination of 50, 54, 55, 56, 57, 58	10
	Roadside Appurtenances	
60	Traffic signs	6
61	Breakaway sign or luminaire supports	10
62	Road edge guardrail	10
63	Median barrier	15
64	Markings, delineators	2
65	Lighting	15
66	Improve drainage structures	20
67	Fencing	10
68	Impact attenuators	10
69	Other roadside	10
6A	Combination of 60-64	10
6B	Combination of 64 and 68	10
6C	Combination of 60 and 62	8
6D	Combination of 60 and 64	4
6E	Combination of 62 and 69	10
6F	Combination of 62, 66 and 69	10
6G	Combination of 60 and 63	10
	Other Safety Improvements	
90	Safety provisions for roadside features and appurtenances	20
99	All projects not otherwise classifiable	20
9A	Combination of 11, 26, 69	10
9B	Combination of 26 and 66	15
9C	Combination of 27, 30, 62 and 99	20
9D	Combination of 11 and 60	8
9E	Combination of 11 and 64	6
9F	Combination of 23, 26, and 62	15
9G	Combination of 27, 61, 62, 64	10
9H	Combination of 22, 39, 65	20
9I	Combination of 23, 61, 62, 64, 65, 66	15

* No code 52 or 53 projects are included in the analysis.

a small portion of projects, implemented under the programs. The cost of improvements evaluated to date is very small compared to total funds obligated as shown in Table VIII-5. It is expected that as more and better data is received evaluation results will shift significantly.

PROGRAM EVALUATION

Based on the data reported, the Rail-Highway Crossing Program showed the best success in reducing accident severity. While reductions in numbers of accidents were greater than for most other programs, the cost per accident reduced was relatively high as shown in Table VIII-2. This is attributable to relatively fewer numbers of accidents to start with and to relatively higher cost of improvements.

The High Hazard Location Program, as previously discussed, is generally keyed to locations where accidents have occurred in the past, and therefore, the program could be expected to yield relatively high percent reductions and low costs per accident reduced. Almost all types of improvements with the exception of "alignment" projects were very successful as shown in Table VIII-4. Cost per fatal and injury accident reduced and total accident reduced was lowest among all the categories analyzed.

The results of the Roadside Obstacle Program evaluation were not

TABLE VIII-4

EVALUATION OF FUNDING PROGRAMS BY TYPE OF IMPROVEMENT

Safety Program or Funding Source	*Type of Improvement															
	Intersection		Cross Section		Structures		Alignment		Railroad Grade Crossing		Roadside Appurtenances		Other		Total	
Rail Highway Crossing	-		-		-		-		20	16	-		-		20	16
									58	36					58	36
High Hazard Locations	17	17	18	23	-		-10	-15	-		11	16	NS	NS	15	18
	15	5	11	3			-	-			10	2	-	-	14	4
Roadside Obstacles	-		-		20	28	-		-		-11	-9	-57	-34	-8	NS
					14	3					-	-	-	-	-	-
Safer Roads Demonstration	57	18	NS	35	-		-		88	86	NS	3	-		NS	4
	2	3	-	2					40	25	-	0.4			-	5
Interstate	67	35	19	19	NS	NS	NS	NS	-		4	NS	21	16	8	4
	4	4	53	21	-	-	-	-			38	-	44	15	42	31
Other Federal-aid	25	21	8	10	40	31	NS	NS	93	78	-13	-16	NS	16	12	11
	13	4	69	18	240	96	-	-	64	46	-	-	-	22	47	16
State and Local	17	13	7	11	NS	NS	32	28	NS	-41	8	6	23	16	12	10
	5	2	40	8	-	-	71	22	-	-	24	12	20	9	24	9
Total	20	17	13	16	19	21	NS	NS	31	25	2	2	15	14	9	9
	10	4	32	8	118	30	-	-	64	41	48	18	45	16	31	11

*See Safety Classification Codes, Table VIII-3.

Cells show the following quantities:

Percent decrease in fatal + injury accidents	Percent decrease in total accidents
Annual cost per fatal + injury accident reduced ($1000)	Annual cost per total accident reduced ($1000)

Minus figures indicate increases in accidents.

NS - No significant change at 95% level of confidence.

TABLE VIII-5

COST OF EVALUATED IMPROVEMENTS IN RELATION TO OBLIGATED FUNDS FOR EACH SAFETY CONSTRUCTION PROGRAM

Safety Programs	Funds Obligated thru 9/30/77 ($ Million)	Cost of Evaluated Improvements ($ Million)
Rail-Highway Crossings (On System)	177.5	19.7
Rail-Highway Crossings (Off System)	17.7	-
High Hazard Locations	187.6	42.0
Roadside Obstacles	154.4	10.2
High Hazard/Roadside Obstacles	76.4	-
Safer Roads Demonstration	206.8	11.5
Pavement Marking Demonstration	179.9	9.9

conclusive. Accidents increased although they were generally not statistically significant. Because the Roadside Obstacle Program is intended to treat only to a certain type of accident, run-off-the-road, it is generally more susceptible to increases of unrelated accident types such as "two car head-on." It may be necessary to rely on more detailed State evaluations to determine the real worth of this program.

The percentage reductions for the Safer Roads Demonstration Program were generally less than for all other funding sources; however, cost per fatal accident and cost per total accident reduced were lower than for most programs. The success in treating accident problems off the Federal-aid system is noteworthy. Intersection improvements had lower costs per accident reduced than rail-highway grade crossing projects which constitute most of the program.

Interstate safety improvements resulted in relatively lower percent reductions in accidents and relative higher costs per accident reduced than overall. Most of the work in this category was either cross section or roadside appurtenance type projects. Cross section projects which include skid treatments resulted in a higher percent reduction in accidents than roadside appurtenance projects. This was probably because skid treatment improvements addressed a higher percentage of total accidents than roadside appurtenance projects did. But roadside appurtenance projects had a lower cost per fatal and injury accident reduced than cross section improvement ($38,000 versus $53,000). These results considered with the Roadside Obstacle Program analysis suggest a need for further study.

Besides the categorical safety and Interstate funds, States make use of regular Federal-aid funds to implement safety improvements. Safety improvements made with these funds show rates of accident reduction of about the same magnitude as safety construction program projects. The work consisted mainly of cross section, intersection, and structures projects. Railroad grade crossing projects resulted in the highest percent reductions in accidents but were relatively high in respect to dollars spent per accident reduced. The cost per accident reduced for structures projects was greater than for any other type improvement probably because factors of serviceability and mobility affected project selection decisions. Intersection projects were effective in decreasing accidents at the lowest cost per accident reduced.

While the primary concern at the Federal level is effective expenditure of Federal funds, State and local agencies fund safety improvement projects with their own funds. Projects implemented with these funds are very effective in reducing accidents at a reasonable cost. Cross section and structure projects accounted for a little more than half the funds spent. Alignment projects showed the greatest reduction in accidents, but at the highest cost per accident reduced. Intersection projects took the least expenditure to reduce an accident.

PAVEMENT MARKING EVALUATION

Because an expressed purpose of the Pavement Marking Demonstration Program was to show the safety effectiveness of pavement markings a special evaluation was designed. Table VIII-6 shows the accident data reported by only 25 States. The data covered varying periods before-and-after the installation of pavement markings and have been factored to reflect annual accident experience. Accidents included in most cases are total accidents and not just the type of accident which pavement markings would be expected to reduce such as night run-off-the-road accidents. The data represents a very small portion of the total funds obligated for Pavement Marking Demonstration projects as can be seen in Table VIII-5.

The percent change in accidents has been calculated for centerlines and edgelines applied separately, and applied together. As previously discussed the Pavement Marking Program is eligible for a wide range of markings in addition to centerlining and edgelining and, therefore, these analyses do not represent an overall program evaluation.

Data submitted by the States were used if at least 10 miles were marked with a particular type of marking and if at least 20 accidents occurred during the year. These data were collected on 37,000 miles of highways marked at a cost of about $9.9 million.

TABLE VIII-6

EVALUATION OF PAVEMENT MARKING DEMONSTRATION PROGRAM

Type of Marking	Total Cost of Evaluated Projects ($1000)	Miles Marked	Average Annual Accidents Before Improvements				*Change in Accidents After Improvements (%)			
			Fatal	Injury	P.D.O.	Total	Fatal	Injury	P.D.O.	Total
Centerline	1,495	4,441	63	1,813	4,244	6,120	-13(NS)	-18	-8	-11
Edgeline	2,328	11,548	127	2,035	2,818	4,980	15	4	1(NS)	3
Center and Edgeline	6,055	21,124	556	9,361	23,243	33,161	-6(NS)	-8	-10	-9
Total	9,878	37,112	746	13,209	30,305	44,261	-3(NS)	-8	-9	-8

*Minus indicates increase; (NS) indicates no significant difference at 95 percent confidence level.

Preliminary analyses show an increase in the number and rate of total accidents occurring after marking. The severity of accidents was generally unchanged.

The range in reported effectiveness was extensive. For centerlines alone, change in total accidents ranged from an 18 percent decrease in Ohio to a 66 percent increase in Nevada. For edgelining alone, the range was from a 43 percent decrease in total accidents in Ohio to a 42 percent increase in Arkansas. When both types of markings were applied, accident experience ranged from a 10 percent decrease in Delaware to a 41 percent increase in North Dakota. Additional study will be necessary to determine the cause of wide variation.

PROJECT EVALUATIONS

The reported evaluation data may be analyzed to determine not only funding program results but also project effectiveness. While the variables discussed at the beginning of the chapter greatly affect project evaluation results, these analyses represent a national aggregate data base that give relative levels of effectiveness. These evaluations use the same data base as the program evaluation and, as such, represent only partial data which in many cases are preliminary. The evaluation data, coded by project type, were included in Table VIII-7 if there were at least 20 annual accidents before the improvement and there was a significant change in the number of accidents after the improvement was made. Fatal accidents

TABLE VIII-7

EVALUATION OF SAFETY PROJECTS BY SAFETY CLASSIFICATION CODE

Safety Construction Project Code and Description	Total Cost of Evaluated Improvements ($1000)	Average Annual Accidents Before Improvements			*Percentage Reduction in Accidents After Improvements			Average Annual Cost Per Accident Reduced ($1000)	
		Fatal + Injury	PDO	Total	Fatal + Injury	PDO	Total	Fatal + Injury	Total
10 - Channelization, left-turn bay	12,138	650	1,529	2,179	13	16	15	22	6
11 - Traffic signals	13,612	1,537	3,504	5,041	15	13	14	9	3
12 - Combination of channelization and traffic signals	12,395	751	1,523	2,274	34	18	23	8	4
13 - Sight distance improved	756	58	109	167	31	35	34	7	2
21 - Lanes added without new median	11,897	126	297	423	33	37	36	33	9
22 - Highway divided, new median added	5,672	72	155	227	11(NS)	21	18	-	17
25 - Skid treatment - grooving	1,941	233	548	781	8(NS)	16	13	-	3
26 - Skid treatment - overlay	14,708	1,308	2,722	4,030	15	22	20	12	3
2A - Combination of pavement widening and overlay skid treatment	1,950	53	39	92	-32	-105	-63	-	-
31 - Replace bridge or major structure	24,249	36	90	126	25(NS)	12(NS)	16	-	129
33 - Minor structure	879	17	43	60	82	91	88	7	2
40 - Horizontal alignment changes (except elimination of grade crossing)	5,264	27	64	91	26(NS)	41	36	-	19
50 - Flashing lights replacing signs	6,890	17	10	27	82	10(NS)	56	80	75
55 - Automatic gates replacing signs	11,365	25	24	49	84	79	82	88	46
56 - Automatic gates replacing active devices	8,804	32	59	91	59	42	48	75	33
5A - Any combination of warning device and surface improvement	10,923	97	95	192	41	41	41	44	22
62 - Road edge guardrail	7,702	585	908	1,493	1(NS)	-10	-5	-	-
63 - Median barrier	15,727	551	1,049	1,600	17	31	26	22	5
64 - Markings, delineators	2,472	1,079	2,561	3,640	-2(NS)	8	5	-	14
65 - Lighting	928	86	113	199	-49	-29	-38	-	-
66 - Improve drainage structures	219	18	24	42	28(NS)	67	50	-	1
67 - Fencing	432	84	154	238	30	25	26	3	1
6C - Combination of signs and guardrail	5,942	383	270	663	27	-13	12	10	14

*Minus figures indicate increases in accidents; (NS) - No significant change in accidents at 95% level of confidence.

are not shown separately in this table because there were insignificant changes in the number of fatal accidents for all but a few project types.

The safety effectiveness of improvements varied markedly suggesting the usefulness of emphasizing particular project types through a systematic process for safety improvements. Intersection improvements demonstrated consistent success probably because of the high numbers of accidents in the before period. There were relatively high percentage reductions in accidents for railroad grade crossing and minor structure projects. There were increases in accidents for some types of roadside appurtenance projects. For projects that include the installation of road edge guardrail, an increase in the number of property damage only accidents is not an uncommon occurrence. The purpose of the guardrail is to reduce the severity of accidents.

CONCLUSIONS

The following conclusions are based on the available effectiveness data:

o The High Hazard Location Program by its demonstratable success should receive continued emphasis through administrative and legislative actions. More attention to selection of projects through a process for safety improvement (PSI) will enhance program payoff.

- Where Roadside Obstacle Program projects were carried out there were small increases in total accidents. The relationship of project type to correctable accidents may account for the increases, but the program will be analyzed further. The evaluation results may indicate a need for more sophisticated project selection techniques and suggest wholesale obstacle removal or treatment only on high type facilities.

- While the Rail-Highway Crossing Program resulted in relatively high percent accident reductions, the cost per accident reduced was also relatively high. If treatment of this particular safety problem is in the national interest, then separate funding will be necessary to assure highway systemwide implementation of rail-highway crossing improvements. All rail crossing improvement projects will not be able to compete with general safety projects on a cost-effectiveness basis.

SECTION II - STATE EVALUATION REPORTS

The data reporting requirements for project evaluations are designed to enable FHWA to assess safety program effectiveness at the national level. While a number of States have complied with these guidelines, most States have not evaluated their own safety programs and projects as input into State level decisionmaking processes. Once evaluation procedures are fully implemented, States will be able to refine or establish new statewide safety program objectives as well as improve the quality of safety projects. Perhaps the biggest draw back to better evaluations is the lack of available funds and, more importantly, personnel to analyze the collected data.

An example of a State that is actively carrying out evaluation studies is Illinois. In the past year they have made, initiated, or updated studies and evaluations in six safety project activities including; (1) elimination of roadside obstacles, (2) lane markings, (3) well-marked crosswalks, (4) raised pavement markers, (5) left-turn acceleration lanes, and (6) a $1.1 million intersection reconstruction.

In addition, the State carried out before-and-after evaluations of safety projects. The results of these evaluations will allow Illinois to determine whether these programs and projects have been effective in meeting their highway safety needs. The evaluation process is an integral function of the overall management and operation of the Illinois highway safety programs.

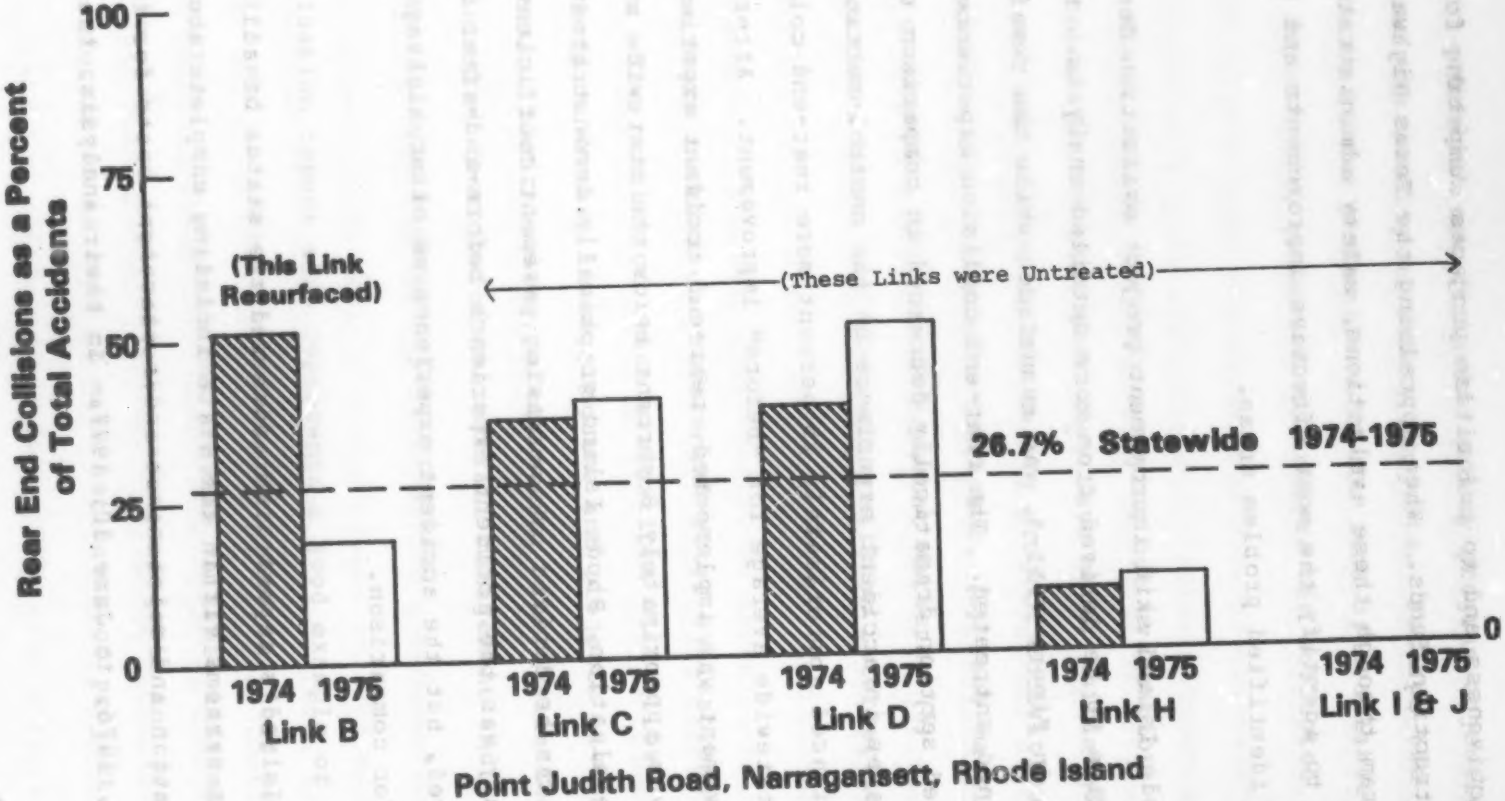
The Texas' evaluation report also represents a good example of evaluations performed to improve the decisions made in their project selection procedures. The evaluations provide valuable information to personnel who plan and implement the safety projects and program. The resulting information is used to make estimates of project effectiveness and to prioritize projects competing for scarce safety construction funds. When appraising the Texas Highway Safety Program through these evaluations, safety administrators will be able to identify the most effective improvements and target them into identified problem areas.

A Rhode Island skid improvement project evaluation demonstrates the benefits to be derived from more detailed analysis. Highway Link B, shown in Figure VIII-1, was resurfaced while the remaining links remained untreated. The rear-end collision experience on the treated section dramatically decreased in comparison to the increases in accident experience on the control sections. Link B experienced approximately 25 percent more rear-end collisions than the statewide average for "before" improvement. After the safety improvement was implemented, rear-end accident experience on this Link was approximately 8 percent below the statewide average. In this evaluation, Rhode Island graphically demonstrated the benefits which can be derived by increasing pavement coefficient of friction. Not only was the accident experience before-and-after improvement measured, but the accident experience on other highway segments was used for comparison.

Rhode Island's report also addressed the status of all crash cushion barrier systems within the State including complete accident information and maintenance and replacement costs for the period July 1, 1976, to June 30, 1977. In their analysis, the State

FIGURE VIII-1

EFFECTS OF RESURFACING ON REAR END COLLISIONS—RHODE ISLAND



SOURCE: RHODE ISLAND HIGHWAY SAFETY REPORT—FY 1977 reported that the majority of vehicle operators had been leaving the accident scene after colliding with the barrier systems without notifying State or local police officials. This hampered the analysis of the effectiveness of the safety device. The unreported accidents varied from minor impacts to severe high-speed collisions.

From the data provided by State maintenance forces, it is possible to derive a benefit cost analysis for the completed improvements. For the 22 crash cushions covered by the report, there were 30 accidents in 1 year. Based on damage to the attenuators, it is estimated that 9 lives and 9 serious injuries were prevented. Using DOT Societal Cost of Motor Vehicle Accidents, this is an estimated $2,613,290 annual benefit due to severity reduction. For these cushions there is an annual installation cost of $33,354 and an annual repair cost of $21,334 for a total annual cost of $54,698. Analysis indicates that for every dollar Rhode Island has spent on these attenuation devices, approximately $48 in benefits have been accrued by the program based on 1 year's reported accident costs.

Pennsylvania's safety improvement project evaluations more clearly show the relation between improvement types and correctable accidents. In Pennsylvania's before-and-after studies of safety improvement projects, data is included which is necessary to the States' overall safety improvement program. For example, the State reports whether the accident occurred on wet or dry surface, during the day or night, and also the type of accident (i.e., angle, rear end, side swipe, etc.). As indicated by the Table VIII-8, these data allow a more thorough analysis of the effectiveness of safety improvement projects. Two hundred-thirty-one before-and-after evaluations of safety improvement projects were completed by Pennsylvania this past year.

The effects of highway improvements may be studied in more detail with the Pennsylvania system than with the national system. The skid treatment overlay project included in Table VIII-8 covered 5.93 miles and cost $624,700. As the table indicates, total accidents decreased by 28.7 percent, with significant reductions in wet and rear-end accidents. Surface overlays were designed to reduce skidding on wet surfaces, thereby decreasing accidents. Pavement widening projects with no lanes added reduced a variety of accident types. There was not only 53 percent reduction in total accidents, but also significant reductions in all types of accidents. The project cost was $9,500 for 2.84 miles of pavement widening. The cross section project to improve superelevation resulted in significant decrease in nighttime accidents (77 percent) and striking fixed object accidents (76 percent). The improvement was directed at roadway curvature and was completed on 1.0 miles of roadway at a cost of $44,300. Perhaps the most cost-effective improvement shown in the table was the installation or upgrading of traffic signs project. A total accident reduction of 52 percent was achieved at a cost of $700.

TABLE VIII-8

PENNSYLVANIA - EFFECTS OF SAFETY IMPROVEMENTS BY TYPE OF ACCIDENT

Type of Improvement	Total Accidents*	Accident Rate*	Type of Accident and Percent Change								
			Total	Wet	Dark	Angle	Rear-end	Hit-Fixed Object	Hit Pedestrian	Head On	Other
Skid Treatment (Overlay)	(b) 258 (a) 184	(b) 0.61 (a) 0.40	-29	-41	-33	+47	-44	-37	-100	+33	-48
Pavement Widening (No lanes added)	(b) 111 (a) 52	(b) 5.16 (a) 0.92	-53	-50	-62	-28	-76	-62	NA	-86	-83
Cross Section Work (Superelevation)	(b) 60 (a) 35	(b) 1.98 (a) 0.88	-42	-55	-77	+19	0	-76	NA	NA	-25
Installation or upgrading of traffic signs	(b) 33 (a) 16	(b) 2.83 (a) 1.17	-52	0	-76	+12	-56	-70	-100	-100	-100

* (b) = Before Improvements
(a) = After Improvements

NA - No accidents of this type before or after

SOURCE: Pennsylvania Safety Improvement Project Evaluation - 1977

Pennsylvania also examined the effect of pavement markings on correctable accidents and the accompanying accident trends on the marked versus all State routes. The accident information was further analyzed to determine the effect of pavement markings on roadways of different widths and on roads with different average daily traffic (ADT). The report also attempted to determine if any relationships exist between the installation of pavement markings and the severity of accidents and between daytime and nighttime accidents.

Pennsylvania was able to illustrate the beneficial effects of centerlines not only with before-and-after studies, but also with comparison to statewide accident trends. In both cases, the projected after accidents compared to actual after accidents showed a decrease particularly for daytime accidents and total correctable accidents. In analyzing the effects of centerlines on accidents, Pennsylvania compared the accident histories of 1,103 miles of local roads marked for the first time with a centerline in 1975. Table VIII-9 illustrates the effects of centerlines on accidents by type and severity. Pennsylvania concluded that the Pavement Marking Demonstration Program should continue, and the direction of the program should be reestablished only after a more lengthy evaluation period. They also recommended that Federal funds should be used only to install markings in those patterns and on those types of roads where significant safety benefits have been demonstrated.

TABLE VIII-9

PENNSYLVANIA - ACCIDENT COMPARISON - BEFORE/AFTER INSTALLATION OF CENTERLINES

Accident Type	Before (1974)	After (1976)	Percent Change	Statistical Significance	After Projected	After Actual	% Change	Statistical Significance
Head on	41	23	-43.9	*Yes	41	23	-43.9	*Yes
Sideswipe	111	62	-44.1	*Yes	119	62	-47.9	*Yes
Hit-Fixed-Object	718	758	+ 5.6		788	758	- 3.8	
Non Collision	45	57	+26.7		49	57	+16.3	
Total Correctable	915	900	- 1.6		999	900	-11.1	*Yes
Night	528	531	+ 1.9		564	531	- 5.9	
Day	387	369	- 4.7		421	369	-12.4	*Yes
Fatal	9	6	-33.3		8	6	-25.0	
Injury	319	273	-14.4	*Yes	314	273	-13.1	*Yes
Non Injury	587	621	+ 5.8		664	621	- 6.5	
All Other Types	642	879	+13.7	*Yes	-	-	-	

*95% Confidence Level

SOURCE: Pennsylvania Pavement Marking Demonstration Program Report - 1977

Missouri evaluated 173 Safer Roads Demonstration projects costing $5.9 million. The State developed priorities for citywide and railroad grade crossing signing projects conforming to the Manual on Uniform Traffic Control Devices.

Before projects were selected, cities of at least 2,500 population were ranked to establish the worst accident records. The cities were those who reported to the Statewide Traffic Accident Record System (STARS) for the 3-year period 1974 to 1976. Accident rates for each accident severity type was established, and then a priority ranking index was developed. This index consisted of factors for each accident severity type. These factors were multiplied by the corresponding accident rates and added together to establish the rank index for that city. Once the cities with serious accident problems were identified, the projects under the Safer Roads Demonstration Program were implemented.

Missouri found the Safer Roads Demonstration Program to be well received by communities, and also a program which proved to return many dollars in benefits compared to the funds spent on the projects. Through analysis of project effectiveness, it was estimated that accident losses could be reduced by $405,930 for an investment of $102,000. Total annual accident savings were estimated at $3,195,000 from projects implemented in Missouri under the Safer Roads Demonstration Program. This means that the total program cost of $6.6 million would be paid back in nearly two years.

IX. SPECIAL FHWA EMPHASIS ON HIGHWAY SAFETY

In order to focus special attention on certain critical transportation needs, the Federal Highway Administrator annually develops a list of program emphasis areas. FHWA Order 1000.1B dated September 3, 1976, included the following emphasis areas in highway safety for the Transition Quarter and Fiscal Year 1977.

- Assist the States in developing a system to set safety priorities.
- Improve methods for ensuring the safety of motorists driving through construction and maintenance zones by: (1) Implementing established principles and accepted standards and guides for traffic safety on ongoing construction projects. (2) Promoting the inclusion of contract specifications and bid items for traffic services in PS&E's prepared by the States. (3) Increasing training in traffic safety management for both FHWA and State personnel. (4) Revising existing standards and guides where experience and improved technical knowledge dictate.
- Produce a schedule for signing and marking all railroad crossings to minimum standards.
- Obligate $550 million of the categorical safety construction funds.

- Obligate all of the FY 1976 and earlier Section 219 (Off-System Roads) and Section 405 (Safer Roads Demonstration) funds.

The following is a description of accomplishments in Safety-oriented Emphasis areas.

- Setting Safety Priorities -- New regulations have been drafted which should assist the States in developing and refining their safety project selection systems. FHWA Division Safety Engineers have worked closely with the States in completing the development of project selection procedures. The safety engineers will continue this liaison with their State counterparts while meeting their responsibilities in administering the safety improvement program. In most cases the States already have an ongoing system by which safety improvement projects are selected. The FHWA efforts at this point consist primarily of helping the State further refine and improve the process. The new regulations should aid further in this effort.

- Safety in Construction and Maintenance Zones -- Special test were conducted for certain barricades frequently used in construction and maintenance zones. The "timber barricades" and the experimental "type X curb" (a truncation of the concrete median barrier) were full scale crash tested and found to be unsatisfactory as a longitudinal traffic barrier. Directives prohibiting their use as positive barriers in construction and maintenance zones on Federal-aid projects were issued by FHWA. These directives can be found in Appendix A.

Field reviews of procedures and practices for handling traffic within construction projects were made in all FHWA regions and selected States. Summary findings and recommendations based on the field reviews are now being developed.

Review comments on the inclusion of contract specifications and bid items for traffic services in PS&E's prepared by the States were solicited through a Notice of Proposed Rulemaking in the Federal Register. The review comments are being analyzed and a new FHPM directive based on this analysis will be prepared and issued.

The Federal Highway Administration has developed three slide-tape presentations and distributed them to field offices for use by State and other highway personnel. These slide-tapes cover the topics of (1) barriers in construction zones, (2) barricades in construction zones, and (3) signing in construction zones.

A course, "Traffic Control for Street and Highway Construction and Maintenance Operations," developed for FHWA under contract was presented 17 times during the Transition Quarter and FY 1977. Approximately 515 persons were trained in the courses including 35 Federal, 330 States, and 150 local employees.

Revisions and improvements were made to FHPM directives concerning safety design and traffic operations. Additions and revisions to the Manual on Uniform Traffic Control Devices (MUTCD) were made.

Continuing research activities in traffic safety, covering both design and operating practices, is underway. Some of the completed research efforts have produced findings enabling FHWA to improve existing standards and design guides. Prominent research efforts completed during this reporting period included investigation of the causative factors for accidents in construction and maintenance zones.

- o Scheduling Installation of Minimum Traffic Control Devices at Railroad Grade Crossings -- All States were asked to submit schedules for meeting minimum signing and marking standards for crossing on all roads and streets. Five States have indicated that the signs and markings at essentially all crossings are in compliance with the minimum standards. Twelve States report that they have a signing and marking schedule for crossings on all streets and roads. Thirty-six States do not yet have a confirmed schedule. Many of these States indicated that more progress could have been reported if Section 203 Off-System funds had been available sooner. As indicated in Chapter VI, 23 USC 405 funds are also being used for this type of improvement.

o Obligation of Categorical Safety Construction Funds -- During FY 1977 and the preceding Transitional Quarter, $638.6 million of safety construction funds including bridge replacement were obligated. This obligated amount is 116.1 percent of the $550 million goal. Obligations by categorical safety construction programs were as shown in the Table IX-1.

o Obligation of Sections 219 and 405 Funds -- States obligated $206.7 million of Section 405 (Safer Roads Demonstration) funds or 84.3 percent of the $245.6 million apportioned. Of the old Section 219 (Off-Systems Roads) funds $159.9 million or 82.3 percent of the apportioned $194 million were obligated by September 30, 1977. The unobligated balance from these two programs is $73 million.

TABLE IX-1

TRANSITION QUARTER AND FISCAL YEAR 1977 OBLIGATIONS FOR HIGHWAY SAFETY IMPROVEMENTS
(in millions of dollars)

Program	T.Q.	FY 1977	Total
Rail-Highway (on-system)	9.9	81.2	91.1
Rail-Highway (off-system)	-	17.6	17.6
High Hazard	26.1	31.6	57.7
Roadside Obstacles	7.6	33.3	40.9
Combined High Hazard and Obstacles	-	64.2	64.2
Pavement Marking	6.3	57.4	63.7
Safer Roads Demonstration	22.7	58.7	81.4
Safer Off-System	-	4.4	4.4
Bridge Replacement	21.8	195.8	217.6
Totals	94.4	544.2	638.6

APPENDIX A

REGULATIONS RELATED TO HIGHWAY SAFETY PROGRAMS

U. S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

SUBJECT FEDERAL-AID PARTICIPATION IN HIGHWAY APPURTENANCES	FHWA NOTICE N 7560.4 November 17, 1977

1. PURPOSE. This issuance is to provide information on the use of Federal-aid funds for safety projects to upgrade highway appurtenances that must be replaced due to vehicle accidents.

2. BACKGROUND

   a. The Federal Highway Administration (FHWA) has supported the upgrading of accident damaged highway appurtenances through regular maintenance activities since the enactment of the 1966 Highway Safety Act. The AASHTO publication "Highway Design and Operational Practices Related to Highway Safety" incorporates a section concerning maintenance betterments. This section indicates that the latest safety concepts should be applied promptly when replacing damaged items.

   b. Some State highway maintenance budgets do not provide adequate funding to include safety betterments when replacing accident damaged appurtenances. These betterments are considered low-cost items that could achieve desirable safety benefits.

   c. Federal-aid highway funds are available for safety related projects. In the past, many States have not utilized these Federal funds for safety betterment projects because administrative costs were considered to be too high for low-cost improvements. Some States have developed statewide programs to upgrade vehicle damaged items by contract or by maintenance forces. This concept reduces administrative costs, increases efficiency, and results in a reduction in total cost.

   d. The FHWA has established a policy that highway appurtenances damaged by vehicle accidents should be upgraded to the latest safety criteria. Funds for safety construction projects (23 U.S.C. 219,23 U.S.C. 151, 23 U.S.C. 153, 23 U.S.C. 405, and Section 203 of the 1973 and 1976 Highway Acts) are available for this type of activity. Where States collect the cost of replacement of damaged highway appurtenances from the responsible party, Federal-aid participation is limited to the "betterment cost."

DISTRIBUTION: H-W-1(Minus CC); H-W(CC)-2
H-W(HO/NG/TO)-3;
H-DM-4

OPI: HHS-11

3. **ACTION**

a. Divisions and regional offices should encourage the States to adopt a policy of upgrading accident damaged appurtenances. The division offices should assist the States in developing procedures for combining projects and reducing red tape for safety projects to upgrade damaged appurtenances. This work could be accomplished with maintenance forces or through the contract method.

b. Safety program construction funds may be expended for the following types of projects:

1. Replacing damaged guardrails to the latest safety criteria.
2. Replacing damaged sign and light supports with safe yielding supports or relocating to safe areas.
3. Connecting replacement guardrail to bridge ends.
4. Upgrading signing and marking at accident sites.
5. Upgrading damaged culverts to provide the latest safety criteria.

H. L. Anderson

H. L. Anderson

U. S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

SUBJECT

Operational Characteristics of the Type X Curb

FHWA BULLETIN

September 23,1977

The Type X Curb is 13 inches high and has the same configuration as the lower portion of the New Jersey concrete median barrier. Recent crash tests on this curb refuted the simulated redirection capabilities reported in NCHRP Report 150 "Effect of Curb Geometry and Location on Vehicular Behavior" and the recently distributed AASHTO "Guide for Selecting, Locating, and Designing Traffic Barriers." Therefore, the Type X Curb is unsatisfactory for use as a positive barrier.

In NCHRP Report No. 150 the approach taken to investigate the effects of several curb designs on vehicle behavior included a combination of full-scale testing and simulated impacts using the Highway Vehicle-Object Simulation Model (HVOSM). Three curbs (AASHTO Types C, E, and H) were selected for detailed study because they represent the curb configurations most commonly used throughout the United States. The Type X Curb was also selected as an experimental barrier-curb configuration.

Eighteen full-scale tests were conducted on the Types C and E Curb configurations to obtain field data for correlation with the HVOSM predictions. The computer model predictions agreed closely with the test results on Type C and E Curbs, thus the model was considered sufficiently validated to use in the investigation of the four curbs.

The HVOSM predictions indicated that the Type X Curb would redirect a full-sized car at an impact angle of 12.5 degrees at speeds of both 45 m.p.h. and 60 m.p.h. Since the Type X Curb had not been crash tested, a research contract with the Southwest Research Institute (SWRI) included crash tests on several traffic barriers including the Type X Curb. The SWRI's test involved a full-scale passenger car traveling at 35 m.p.h. and impacting a precast, moveable, Type X Curb at a 7 degree angle. In this test the car, upon initial impact, straddled the curb with little or no vehicle deceleration. The speed was slower and the angle of impact flatter thus, the result is contrary to the HVOSM predictions included in NCHRP Report 150 and the AASHTO Guide for Selecting, Locating, and Designing Traffic Barriers. Accordingly, the Type X Curb is not a positive barrier and is unacceptable for use in locations requiring a positive barrier.

DISTRIBUTION: H-W(EO/OA/PA/PR/RD/SA)-1;H-W(DV/HI/HO/HS/NG/RS/TO)-2 HHS-12
H-DM-1;H-D(BR/CM/ED/EX/FH/RP/WB)-2
H-M(AM/BR/EC/FO/RP)-2
H-M(GR/MP/SH)-4

A 16 mm film of the crash test on the Type X Curb is available for loan upon request from the Federal Highway Administration's Office of Research, Protective Systems Group.

Robert A. Kaye

For H. L. Anderson
Associate Administrator for Safety

U. S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

SUBJECT Temporary Barriers in Construction Zones

FHWA NOTICE
N 5160.27
February 2, 1977

1. PURPOSE. To provide guidelines for the use of "Timber Barricade" traffic control devices.

2. CANCELLATION. FHWA Notice N 5160.24 dated August 30, 1976, "Use of Traffic Control Devices in Construction Zones" is hereby cancelled.

3. BACKGROUND

   a. FHWA Notice N 5160.24, dated August 30, 1976, cautioned against further use of "Timber Barricades" in that questions had been raised regarding the advisability of further use of such barricades as barriers for traffic control in construction zones. Field personnel were asked to carefully review from a safety perspective the present and proposed use of this type of device, particularly on high-speed, high-density facilities. It was further suggested that serious consideration be given to the use of other barrier and channelizing devices in accordance with Part VI of the Manual on Uniform Traffic Control Devices (MUTCD) and to sound engineering practice.

   b. Full scale crash tests have been completed on the "Timber Barricades" using a full-size passenger car impacting at 38.5 m.p.h. at 7 degrees and 35.2 m.p.h. at 15 degrees. In each case, the "Timber Barricades" failed to prevent penetration and did not adequately redirect the vehicle. The horizontal and upright members splintered into many pieces and the resulting flying debris could have been a hazard to construction personnel, pedestrians, or occupants of the impacting vehicle or passing vehicles. These tests confirmed that the safety features of "Timber Barricades" when used as a positive barrier device are not acceptable at 35 m.p.h. speeds. Where there is a need to physically restrain vehicles, other types of barriers are available to control traffic in construction zones in a safer manner.

DISTRIBUTION: Headquarters
Regions
Divisions

OPI: HTO-21

c. The "Timber Barricade" has been defined as a type of device consisting of a wood sill base and a combination of vertical and horizontal boards.

4. ACTION

a. The results of previous experience have been confirmed by full-scale testing research. It has been concluded that effective immediately, "Timber Barricades" shall not be approved for use on direct Federal or Federal-aid projects as a positive barrier at any speed. Further, the use of these devices should be approved for delineating work areas only on an exception basis and only for city street types of improvements where operating speeds of 20 m.p.h. or less could be expected. Where appropriate, change orders should be considered to replace "Timber Barricades" on projects already under contract.

b. Where positive barriers are needed to control traffic in construction zones, devices other than "Timber Barricades" such as concrete safety-shape barriers and metal beam systems are recommended. When channelization or delineation is the primary need, devices discussed in Part VI of the MUTCD, such as barricades, cones, or vertical panels should be used.

c. Copies of the 16 mm film showing the full-scale crash tests will be provided to each FHWA Regional Office.

J J Crowley

J. J. Crowley, Director
Office of Traffic Operations

APPENDIX B

PROCEDURAL INFORMATION ON PROGRAM PROCESS BY STATE

TABLE B-1

RAILROAD GRADE CROSSINGS

STATE	SURVEY UPDATE		PRIORITY SELECTION
	State	Local	All Crossings
ALABAMA	S	S	ACEHIPTVW
ALASKA	S	S	AEHTVW
ARIZONA	S	S	ACEHIPTVW
ARKANSAS	NS	NS	ACHIPTVW
CALIFORNIA	S	S	ACHIPTVW
COLORADO	NS	N	AHW
CONNECTICUT	NS	NS	HC
DELAWARE	S	S	CHW
FLORIDA	NS	NS	HI
GEORGIA	N	N	AHPVW
HAWAII	-	-	-
IDAHO	N	N	HITVW
ILLINOIS	N	N	ACHITV
INDIANA	N	N	CHPTV
IOWA	N	N	ACHITV
KANSAS	S	S	CHIPTVW
KENTUCKY	N	S	ACHIPTVW
LOUISIANA	N	*	ACHIPW
MAINE	N	N	ACHIW
MARYLAND	N	N	ACEHIPTVW
MASSACHUSETTS	S	S	ACHIPTVW
MICHIGAN	S	S	1/
MINNESOTA	N	N	ACHIPTVW
MISSISSIPPI	N	N	H
MISSOURI	NS	2/	3/
MONTANA	NS	NS	ACHITVW
NEBRASKA	NS	NS	ACEITVW
NEVADA	N	N	ACEHIW
NEW HAMPSHIRE	N	N	HW
NEW JERSEY	S	S	ACITW
NEW MEXICO	N	N	HIPW
NEW YORK	N	N	ACHIPTVW
NORTH CAROLINA	N	N	4/
NORTH DAKOTA	NS	NS	5/
OHIO	NS	NS	AH
OKLAHOMA	N	N	H
OREGON	S	S	ACHIPTVW
PENNSYLVANIA	NS	NS	ACEHITVW
RHODE ISLAND	S	S	AHI
SOUTH CAROLINA	N	N	ACITV
SOUTH DAKOTA	N	N	ACHITW
TENNESSEE	NS	*	AHITVW
TEXAS	S	S	AHI
UTAH	S	S	ACHIPTVW
VERMONT	6/	7/	8/
VIRGINIA	NS	NS	ACHITV
WASHINGTON	N	N	9/
WEST VIRGINIA	N	N	ACHIPTVW
WISCONSIN	N	S	ACIPTVW
WYOMING	NS	NS	ACHITV
DIST. OF COL.	S	-	CITVW
PUERTO RICO	S	S	-

Footnotes are on following page.

FOOTNOTES FOR TABLE B-1

* = Not Reported
- = Not Applicable

SURVEY UPDATE

N = According to National Railroad-Highway Crossing Inventory Update Manual
S = State Inventory
Y = Other

PRIORITY SELECTION

A = Accident history
C = Physical characteristics of the crossing
E = Cost-benefit analysis
H = Hazard rating index
I = On-site investigation
P = People factor (buses, passenger trains, etc.)
T = Characteristics of train traffic
V = Characteristics of highway traffic
W = Existing warning devices
Y = Other
Z = Under development

OTHER

1/ = State F.A. - CIPTVW
State N.F.A. - CIPTVWZ
Local - ACEHIPTVW
2/ = Local F.A. - NS
Local N.F.A. - NY Y = Public Service Commission Survey
3/ = State - CHITV
Local F.A. - CHITV
Local N.F.A. - CEHI
4/ = State - AHI
Local - AH
5/ = State - ACHITVW
Local - ACITVWZ
6/ = State F.A. - NS
State N.F.A. - N
7/ = Local F.A. - NS
Local N.F.A. - N
8/ = State F.A. - ACHIW
State N.F.A. - ACITVW
Local F.A. - AHITVW
Local N.F.A. - ACHIW
9/ = State F.A. - AHI
State N.F.A. - Not Applicable
Local F.A. - AHI
Local N.F.A. - HW

TABLE B-2

RAILROAD GRADE CROSSINGS

STATE	PERCENT OF NON-COMPLYING CROSSINGS AND COMPLIANCE TARGET DATES					
	STATE HIGHWAYS			LOCAL HIGHWAYS		
	F.A. (%)	NON-F.A. (%)	TARGET DATE	F.A. (%)	NON-F.A. (%)	TARGET DATE
ALABAMA	0	0	-	0	30	1978
ALASKA	0	0	-	0	10	1978
ARIZONA	0	0	-	5	5	1978
ARKANSAS	*	*	1979	*	75	1980
CALIFORNIA	5	5	*	Unk	Unk	*
COLORADO	21	31	1978	73	73	1978
CONNECTICUT	40	20	*	75	90	*
DELAWARE	19	19	1979	19	19	1979
FLORIDA	0	1	1978	20	40	Unk
GEORGIA	60	60	1979	60	60	1979
HAWAII	0	0	-	0	0	-
IDAHO	38	-	1978	73	90	1982
ILLINOIS	3	8	1979	45	75	1980
INDIANA	5	5	1982	40	40	1982
IOWA	0	0	-	10	15	*
KANSAS	0	0	-	0	0	-
KENTUCKY	5	7	1978	4	61	1978
LOUISIANA	0	15	1980	*	*	*
MAINE	50	50	1979	50	50	1979
MARYLAND	30	50	1978	90	95	1979
MASSACHUSETTS	0	0	-	0	0	-
MICHIGAN	Unk	Unk	1981	Unk	Unk	1981
MINNESOTA	*	*	*	49	49	1982
MISSISSIPPI	Unk	Unk	Unk	Unk	Unk	Unk
MISSOURI	2	2	1978	10	15	1978
MONTANA	75	Unk	1978	*	Unk	*
NEBRASKA	Unk	Unk	1979	Unk	Unk	1979
NEVADA	0	0	-	0	95	*
NEW HAMPSHIRE	Unk	Unk	Unk	Unk	Unk	Unk
NEW JERSEY	15	15	1979	65	65	1979
NEW MEXICO	75	90	1978	75	90	1978
NEW YORK	Unk	Unk	1979	Unk	Unk	1979
NORTH CAROLINA	6	7	1979	0	12	1979
NORTH DAKOTA	10	10	1978	25	50	Unk
OHIO	Unk	Unk	1979	Unk	Unk	1979
OKLAHOMA	6	68	1980	6	68	1980
OREGON	20	20	1978	20	20	1978
PENNSYLVANIA	Unk	Unk	Unk	Unk	Unk	Unk
RHODE ISLAND	5	0	Unk	5	5	Unk
SOUTH CAROLINA	11	69	1978	5	35	1978
SOUTH DAKOTA	6	10	*	22	55	*
TENNESSEE	Unk	Unk	Unk	Unk	Unk	Unk
TEXAS	80	90	1981	90	95	1981
UTAH	*	1	1979	4	26	1979
VERMONT	100	90	1978	80	35	1978
VIRGINIA	38	67	1977	85	85	1977
WASHINGTON	0	-	-	Unk	Unk	1980
WEST VIRGINIA	68	62	1978	70	46	1978
WISCONSIN	Unk	Unk	1981	Unk	Unk	1981
WYOMING	3	0	1978	1	16	*
DIST. OF COL.	40	40	1978	-	-	-
PUERTO RICO	0	0	-	0	0	-

FOOTNOTES:

FA = Federal-Aid
- = Not Applicable
* = Not Reported
Unk = Unknown

TABLE B-3

HIGHWAY LOCATION REFERENCE SYSTEM

STATE	MILES COVERED (Percent)					EXPECTED COMPLETION (Year)				
	INTERSTATE	STATE - F.A.	STATE - N.F.A.	LOCAL - F.A.	LOCAL - N.F.A.	INTERSTATE	STATE - F.A.	STATE - N.F.A.	LOCAL - F.A.	LOCAL - N.F.A.
ALABAMA	100	100	100	100	100	-	-	-	-	-
ALASKA	-	100	100	100	20	-	-	-	-	1978
ARIZONA	100	100	100	100	100	-	-	-	-	-
ARKANSAS	100	100	100	0	0	-	-	-	*	1981
CALIFORNIA	100	100	100	Var	Var	*	*	*	LP	LP
COLORADO	100	100	100	100	100	-	-	-	-	-
CONNECTICUT	100	100	100	100	100	-	-	-	-	-
DELAWARE	100	100	100	100	100	-	-	-	-	-
FLORIDA	100	98	98	*	*	-	1978	1978	*	*
GEORGIA	100	100	100	100	100	-	-	-	-	-
HAWAII	100	100	100	37	0	-	-	-	1980	1983
IDAHO	100	100	-	100	2	-	-	-	-	-
ILLINOIS	92	100	100	90	75	1979	-	-	1985	1985
INDIANA	30	20	0	25	1	1978	1978	1978	1978	*
IOWA	100	100	100	100	100	-	-	-	-	-
KANSAS	100	100	100	0	0	-	-	-	1981	1981
KENTUCKY	100	100	100	0	0	-	-	-	Unk	Unk
LOUISIANA	100	100	100	-	-	-	-	-	1980	1982
MAINE	100	100	11	100	0	-	-	1978	-	1978
MARYLAND	100	100	100	100	100	-	-	-	-	-
MASSACHUSETTS	100	100	100	100	100	-	-	-	-	-
MICHIGAN	87	94	100	24	24	1977	1977	*	1979	1979
MINNESOTA	100	100	100	100	100	-	-	-	-	-
MISSISSIPPI	100	100	100	100	100	-	-	-	-	-
MISSOURI	100	100	100	*	*	-	-	-	*	*
MONTANA	100	100	100	*	100	-	-	-	*	-
NEBRASKA	100	100	100	100	*	-	-	-	-	*
NEVADA	100	100	100	100	100	-	-	-	-	-
NEW HAMPSHIRE	100	100	100	100	*	1980	1980	1980	1980	*
NEW JERSEY	100	100	100	100	100	-	-	-	-	-
NEW MEXICO	100	100	100	100	90	-	-	-	-	Unk
NEW YORK	100	100	100	0	0	-	-	-	1980	1980
NORTH CAROLINA	100	100	100	100	100	-	-	-	-	-
NORTH DAKOTA	100	100	100	100	100	-	-	-	-	-
OHIO	100	100	100	100	100	-	-	-	-	-
OKLAHOMA	100	100	100	100	100	-	-	-	-	-
OREGON	100	100	100	50	50	-	-	-	Unk	Unk
PENNSYLVANIA	100	100	88	Unk	Unk	-	-	-	*	*
RHODE ISLAND	100	100	100	100	100	-	-	-	-	-
SOUTH CAROLINA	100	100	100	100	100	-	-	-	-	-
SOUTH DAKOTA	100	100	100	100	100	-	-	-	-	-
TENNESSEE	100	100	100	75	Unk	-	-	-	1978	1983
TEXAS	100	100	100	100	Unk	-	-	-	-	Unk
UTAH	100	100	100	100	100	-	-	-	-	-
VERMONT	100	100	100	100	100	-	-	-	-	-
VIRGINIA	100	100	86	*	*	-	-	1978	*	*
WASHINGTON	100	100	-	100	100	-	-	-	-	-
WEST VIRGINIA	100	100	100	-	-	-	-	-	-	-
WISCONSIN	100	100	100	100	100	-	-	-	-	-
WYOMING	100	100	100	100	4	-	-	-	-	1979
DIST. OF COL.	100	90	90	-	-	-	1981	1981	-	-
PUERTO RICO	-	100	100	100	100	-	-	-	-	-
AMERICAN SAMOA	-	0	0	-	-	-	1977	1977	-	-
GUAM	-	53	*	*	0	-	1979	*	*	1979
VIRGIN ISLANDS	-	*	*	*	*	-	*	*	*	*

Footnotes are on following page.

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FOOTNOTES FOR TABLE B-3

FA = Federal-Aid
- = Not Applicable
* = Not Reported
Var = Varies
LP = Local Priority
Unk = Unknown

TABLE B-4

DATA COLLECTION AND ANALYSIS

STATE	VOLUME DATA CORRELATION (Percent)					HIGHWAY DATA CORRELATION					HAZARDOUS LOCATION CRITERIA				
	INTERSTATE	STATE - F.A.	STATE - N.F.A.	LOCAL - F.A.	LOCAL - N.F.A.	INTERSTATE	STATE - F.A.	STATE - N.F.A.	LOCAL - F.A.	LOCAL - N.F.A.	INTERSTATE	STATE - F.A.	STATE - N.F.A.	LOCAL - F.A.	LOCAL - N.F.A.
ALABAMA	0	100	100	0	0	N	Y	N	N	N	A	AR	AS	AS	AS
ALASKA	-	100	100	100	100	-	Y	Y	Y	U	-	AERS	AERS	AERS	AERS
ARIZONA	100	100	100	80	80	U	U	U	N	N	RS	RS	RS	A	A
ARKANSAS	100	100	100	100	0	Y	Y	Y	N	N	AR1/	AR1/	AR1/	*	Z
CALIFORNIA	100	100	100	Var	Var	Y	Y	Y	Var	Var	ARS	ARS	ARS	ARS	Var
COLORADO	100	100	100	0	0	U	U	U	N	N	AR	ARS	ARS	AS	1/
CONNECTICUT	100	100	100	0	0	U	U	U	U	U	AR2/	AR2/	AR2/	A2/	A2/
DELAWARE	100	100	100	100	0	N	N	N	N	N	ARS	ARS	ARS	ARS	ARS
FLORIDA	100	100	100	0	0	Y	Y	Y	U	U	R	R	R	Z	Z
GEORGIA	100	100	100	100	20	U	U	U	U	U	ARS	ARS	ARS	A	A
HAWAII	100	100	100	15	0	U	U	U	N	N	AERZ	AERZ	AERZ	Z	Z
IDAHO	100	100	-	100	100	Y	Y	-	Y	N	A	A	-	A	-
ILLINOIS	100	100	100	0	0	U	U	U	N	N	R	R	R	AS	Z
INDIANA	100	100	0	100	4	U	U	U	U	U	A	A	A	A	A
IOWA	0	0	0	0	0	N	N	N	N	N	RS	RS	RS	RS	RS
KANSAS	100	100	100	0	0	Y	Y	Y	N	N	AR	AR	AR	Z	Z
KENTUCKY	0	0	0	0	0	N	N	N	N	N	A	A	A	Z	Z
LOUISIANA	100	100	100	-	-	Y	Y	Y	N	N	ARS	ARS	ARS	*	*
MAINE	100	100	10	100	0	U	U	U	U	U	R	R	R	R	1/
MARYLAND	100	100	100	25	20	Y	Y	Y	Y	Y	ARS	ARS	ARS	A	A
MASSACHUSETTS	100	100	100	50	50	Y	Y	Y	U	U	ARS	ARS	ARS	ARS	ARS
MICHIGAN	100	100	100	*	*	Y	Y	Y	*	*	AERSZ	AERSZ	AERSZ	AEZ	AEZ
MINNESOTA	0	0	0	0	0	U	U	U	U	N	AR	AR	AR	Z	Z
MISSISSIPPI	100	100	100	100	100	Y	Y	Y	Y	Y	AR	AR	AR	AR	Z
MISSOURI	100	100	100	*	*	U	U	U	*	*	ALR	ALR	ALR	*	*
MONTANA	100	100	0	*	0	N	N	N	*	N	ARS	ARS	A	*	Z
NEBRASKA	*	*	*	*	*	*	Y	Y	*	*	*	RS	RS	*	*
NEVADA	0	0	0	0	0	N	N	N	N	N	AES	AES	AES	AES	AES
NEW HAMPSHIRE	20	20	20	20	20	Y	U	U	U	U	AS	AS	AS	AS	AS
NEW JERSEY	100	100	100	0	0	Y	Y	Y	U	U	AERS	AERS	AERS	Z	Z
NEW MEXICO	100	100	100	100	0	Y	Y	Y	Y	U	AR	AR	AR	Z	Z
NEW YORK	100	100	100	0	0	Y	Y	Y	U	U	AES	AES	AES	AES	AES
NORTH CAROLINA	100	100	11	0	0	Y	U	U	U	U	ARS	ARS	ARS	ARS	ARS
NORTH DAKOTA	0	0	0	0	0	N	N	N	Y	Y	ALRS	ALRS	ALRS	ARZ	ARZ
OHIO	100	100	100	20	20	Y	Y	Y	N	N	R	R	R	A	A
OKLAHOMA	100	100	100	0	0	Y	Y	Y	Y	Y	RS	RS	RS	AS	AS
OREGON	100	100	100	0	0	Y	Y	Y	N	N	AR	AELR	AELR	AE	2/
PENNSYLVANIA	100	100	100	Unk	Unk	Y	Y	Y	Y	Y	ARS3/	ARS3/	ARS3/	AS3/	AS3/
RHODE ISLAND	30	15	10	10	0	N	N	N	N	N	AES	AES	AES	AES	AES
SOUTH CAROLINA	100	100	100	100	100	Y	Y	Y	Y	Y	ARS	ARS	ARS	LR	LR
SOUTH DAKOTA	*	*	*	*	*	Y	Y	Y	Y	Y	AERS	AERS	AERS	*	*
TENNESSEE	100	100	100	100	Unk	Y	Y	Y	Y	U	AERS	AERS	AERS	*	*
TEXAS	100	100	100	0	0	Y	Y	Y	N	N	ALR	ALR	ALR	A4/	A4/
UTAH	100	100	100	100	50	U	U	U	N	N	ARS	ARS	ARS	ARS	ARSZ
VERMONT	100	100	100	100	0	Y	Y	Y	U	N	AR	AR	AR	AR	AR
VIRGINIA	100	100	100	*	*	U	U	U	*	*	AERS	AERS	AERS	*	*
WASHINGTON	100	100	-	Unk	Unk	Y	Y	-	N	N	AR	AR	-	AR	AR
WEST VIRGINIA	-	-	-	-	-	U	U	U	U	U	ARS	ARS	ARS	ARS	ARS
WISCONSIN	100	100	100	0	0	Y	Y	Y	N	N	ALRS	ALRS	ALRS	AS	AS
WYOMING	100	100	100	30	0	Y	Y	Y	Y	N	A	A	A	A	A
DIST. OF COL.	*	*	*	-	-	U	U	U	-	-	AERS	AERS	AERS	-	-
PUERTO RICO	-	100	100	100	100	-	Y	Y	Y	Y	-	S	S	S	S
AMERICAN SAMOA	-	100	100	-	-	-	N	N	-	-	-	ALR	AL	-	-
GUAM	-	0	*	*	0	-	N	*	*	N	-	L	*	*	L
VIRGIN ISLANDS	-	0	0	*	*	-	N	N	*	*	-	ALS	ALS	*	*

Footnotes are on following page.

FOOTNOTES FOR TABLE B-4

FA = Federal-Aid
- = Not Applicable
* = Not Reported
Var = Varies
Unk = Unknown

HIGHWAY DATA CORRELATION

Y = Yes
N = No
U = Under Development

HAZARDOUS LOCATION CRITERIA

A = Number of Accidents
E = Economic loss/accident cost
L = Specific number of locations
R = Accident rate, including rate-quality control
S = Accident severity
Z = Under Development

OTHERS

1/ = By Request
2/ = First Come/First Serve
3/ = Historical Trend Analysis
4/ = Potential

TABLE B-5
HAZARDOUS LOCATIONS/ROADSIDE OBSTACLES

STATE	HAZARDOUS LOCATION Project Selection					ROADSIDE OBSTACLE Project Selection				
	INTERSTATE	STATE - F.A.	STATE - N.F.A.	LOCAL - F.A.	LOCAL - N.F.A.	INTERSTATE	STATE - F.A.	STATE - N.F.A.	LOCAL - F.A.	LOCAL - N.F.A.
ALABAMA	*	E1/	E1/	E1/	E1/	*	AH	A	AH	AH
ALASKA	-	CE	CE	CE	CE	-	AEOV	AEOV	AEOV	AEOV
ARIZONA	CEIPR	CEIPR	CEIPR	C	C	AO	HIOV6/	HOV6/	Z	Z
ARKANSAS	CEIR	CEIR	CEIR	*	CI	AEI	AEI	AEI	*	*
CALIFORNIA	CER	CER	CER	CER	Var	AI	AIZ	AIZ	Var	Var
COLORADO	CEIR	CEIR	CEIR	CEIR	I2/	AOSV	AOSV	AOSV	AOSV	AOSV
CONNECTICUT	CE	CE	CE	C	C	0	0	0	0	*
DELAWARE	CEI	CEI	CEI	CEI	*	AHISV	AHISV	AHISV	AHISV	AHISV
FLORIDA	EIP	CEI	EIP	Unk	Unk	HO	AEIO	AIO	Unk	Unk
GEORGIA	CEI	CEI	CEI	CEI	CEI	AHIO	AHIO	AHIO	AHIO	AHIO
HAWAII	CZ4/	CZ4/	CZ4/	*	*	AEISVZ4/	AEISVZ4/	AEISVZ4/	*	*
IDAHO	CR	CR	-	CR	-	I	I	-	-	-
ILLINOIS	CIPR	CIPR	CIPR	CIPR	CIPR	AEHIOV	AEHIOV	AEHIOV	AEHIOV	AEHIOV
INDIANA	CE	CE	CE	CE	CE	IV	IV	IV	None	None
IOWA	CER	CER	CER	ER	ER	IOV7/	AHOV	AHOV	*	*
KANSAS	CPR	CPR	CPR	Z	Z	AIOV	AIOV	AIOV	None	None
KENTUCKY	CEIP	CEIP	CEIP	Z	Z	-	AOSV	AOSV	-	-
LOUISIANA	CEIPR	CEIPR	CEIPR	*	*	AIO3/	AEHIOSV	AEHIOSV	*	*
MAINE	CI	CI	CI	CI	IR	AIO	AIO	AIO	AIO	AIO
MARYLAND	CEIPR	CEIPR	CEIPR	Z	Z	AEI	AEHIV	AEHIV	Z	Z
MASSACHUSETTS	CEIPR	CEIPR	CEIPR	CEIPR	CEIPR	AIOV	AIOV	AIOV	AIOV	AIOV
MICHIGAN	CEIPR	CEIPR	CEIPR	CERZ	CERZ	AEI	AEI	AEI	*	*
MINNESOTA	ER	ER	ER	Z	Z	I	I	I	None	None
MISSISSIPPI	CEIP	CEIP	CEIP	CEIP	Z	HI	HI	HI	None	None
MISSOURI	CEIPR	CEIPR	CEIPR	*	*	*	AEIO	AEIO	*	*
MONTANA	CEIPR	CEIPR	CEIPR	*	Z	AEOV	AEOV	AEOV	*	Z
NEBRASKA	*	CEI	CEI	CEI	CEI	*	AEIOV	AEIOV	AEIOV	AEIOV
NEVADA	CEPR	CEPR	CEPR	CEPR	CEPR	AEISV	AEISV	AEISV	AEISV	AEISV
NEW HAMPSHIRE	CIR	CIR	CIR	CIR	CIR	I	I	I	I	I
NEW JERSEY	CEIPR	CEIPR	CEIPR	Z	Z	AI	AI	AI	AI	AI
NEW MEXICO	EIPR	EIPR	EIPR	EIPR	EIPR	AOV	AOV	AOV	AOV	A
NEW YORK	R	R	R	R	R	AEHIOSV8/	AEHIOSV8/	AEHIOSV8/	AEHIOSV8/	AEHIOSV8/
NORTH CAROLINA	CEIR	CEIR	CEIR	CEIR	CEIR	HIOSV	HIOSV	HIOSV	None	None
NORTH DAKOTA	CEI	CI	CI	CZ	CZ	AI	AHIO	AHIO	Var	Var
OHIO	R	R	R	C	C	I	AHIOV	AHIOV	Z	Z
OKLAHOMA	CR	CR	CR	CR5/	CR5/	A	AHV	AHV	A	A
OREGON	CIP	CER	CER	CEPR	3/	AHIOSV	AHIOSV	AHIOSV	AHIOSV	3/
PENNSYLVANIA	CE	CE	CE	CE	CE	AEH	AEH	AEH	AEH	AEH
RHODE ISLAND	C	C	C	C	C	0	0	0	0	0
SOUTH CAROLINA	CIP	CIP	CIP	CIP	CIP	AIV	AIV	AIV	AIV	AIV
SOUTH DAKOTA	CEIPR	CEIPR	CEIPR	*	*	AIOV	AIOV	AIOV	*	*
TENNESSEE	CIP	CIP	CIP	P5/	P5/	AHIOV	AHIOV	AHIOV	A5/	A5/
TEXAS	E	E	E	E	E	EI	EI	EI	EI	EI
UTAH	CEIPR	CEIPR	CEIPR	CEIPR	CEIPRZ	-	AEOV	-	-	-
VERMONT	CP	CP	CP	CP	CP	AIV	AHIOSV	AHIOSV	AHIOSV	AHIOSV
VIRGINIA	CEIPR	CEIPR	CEIPR	*	*	HI	AEHIOSV	AEHIOSV	*	*
WASHINGTON	CE	CE	-	CE	CE	AEIOV	AEIOV	-	AEI	AEI
WEST VIRGINIA	CIP	CIP	CIP	CIP	CIP	AHISV	AHISV	AHISV	-	-
WISCONSIN	CIP	CIP	CIP	CIP	CIP	HIO	HIO	HIO	AZ	AZ
WYOMING	CEI	CEI	CEI	CEI	CEI	AO	AO	AO	AO	AO
DIST. OF COL.	CR	CR	CR	-	-	AIO	AIO	AIO	-	-
PUERTO RICO	-	CIPR	CIPR	CIPR	CIPR	-	EV9/	EV9/	EV9/	EV9/
AMERICAN SAMOA	-	CI	C	-	-	-	HI	HI	-	-
GUAM	-	C	*	*	C	-	Z	*	*	Z
VIRGIN ISLANDS	-	C	C	*	*	-	0	0	*	*

Footnotes are on following page.

FOOTNOTES FOR TABLE B-5

FA = Federal-Aid
- = Not Applicable
* = Not Reported
Var = Varies
Unk = Unknown

HAZARDOUS LOCATION PROJECT SELECTION

C = Same as Hazardous Location Criteria
E = Cost-benefit analysis
I = On-site investigation
P = Project cost
R = Accident and/or severity reduction expected from improvement
Z = Under Development

ROADSIDE OBSTACLE PROJECT SELECTION

A = Accident data
E = Cost-benefit analysis
H = Highway system or type
I = Type of Obstacle/type of improvement
O = Obstacle survey data
S = Traffic speed or speed limit
V = ADT
Z = Under development

OTHERS

1/ = Budget Optimization
2/ = By Committee
3/ = First Come/First Serve
4/ = Feasibility/Distribution
5/ = By Request
6/ = Available Maintenance Forces
7/ = Hazard Index
8/ = Geometrics
9/ = Same as High Hazard

TABLE B-6

SKID IMPROVEMENT PROJECTS/NARROW BRIDGES

STATE	SKID IMPROVEMENT PROJECT SELECTION					NARROW BRIDGE PROJECT SELECTION				
	INTERSTATE	STATE - F.A.	STATE - N.F.A.	LOCAL - F.A.	LOCAL - N.F.A.	INTERSTATE	STATE - F.A.	STATE - N.F.A.	LOCAL - F.A.	LOCAL - N.F.A.
ALABAMA	*	ASV	ASV	-	-	*	R	R	-	-
ALASKA	-	Z	Z	Z	Z	-	HRS	HRS	HRS	Z
ARIZONA	AGHIPSVW	AGHIPSVW	AGHIPSVW	None	None	S	HR1/	HR1/	H1/	H1/
ARKANSAS	GISW	GISW	GISW	*	IPSZ	H	H	H	*	X
CALIFORNIA	GSVW	GSVW	GSVW	Var	Var	Z	Z	Z	X	X
COLORADO	IPSW	IPSW	IPSW	IPS	IPS	HS	HS	HS	HS	HS
CONNECTICUT	AIPSW	AIPSW	AIPSW	AIPSW	*	S	S	S	S	*
DELAWARE	*	SW	SW	SW	SW	*	HR	HR	HR	HR
FLORIDA	AGIS	AGIS	AGIS	Unk	Unk	2/	R3/	3/	Unk	Unk
GEORGIA	AISW	AISW	AISW	AISW	AISW	HR	HR	HR	HR	HR
HAWAII	ASWZ	ASWZ	ASWZ	*	*	*	HR	HR	*	*
IDAHO	HS	HS	-	-	-	RS	RS	-	S	S
ILLINOIS	AGHSVW	AGHSVW	AGHSVW	AGHSVW	AGHSVW	HR	HR	HR	HR	HR
INDIANA	AHS	AHS	AHS	AS	AS	HR	HR	HR	None	None
IOWA	SW	SW	SW	*	*	*	*	*	*	S
KANSAS	GHPSVW	GHPSVW	GHPSVW	-	-	H3/	H3/	H3/	3/	3/
KENTUCKY	AGHIPSVW	AGHIPSVW	AGHIPSVW	AGHIPSVW	-	3/	3/	3/	3/	-
LOUISIANA	ASW	AIPSVW	AIPSVW	*	*	X	R	R	*	*
MAINE	H	H	H	H	AW	S	S	S	S	X
MARYLAND	AHSW	AHSW	AHSW	Z	Z	4/	4/	4/	4/	4/
MASSACHUSETTS	AGIPSVW	AGIPSVW	Z	Z	Z	X	X	X	X	X
MICHIGAN	AHSW	AHSW	AHSW	*	*	HR	HR	HR	*	*
MINNESOTA	AHSW	AHSW	AHSW	None	None	-	X	X	X	X
MISSISSIPPI	SW	SW	SW	Z	None	R	R	R	X	X
MISSOURI	AISW	AISW	AISW	*	*	*	H	H	*	*
MONTANA	AHISVW	AHISVW	AHISVW	*	Z	HRS	HRS	HRS	*	Z
NEBRASKA	*	*	*	*	*	*	R	R	R	R
NEVADA	HSWZ	HSWZ	HSWZ	HSWZ	HSWZ	R	R	R	R	R
NEW HAMPSHIRE	S	S	S	S	S	S	S	S	S	S
NEW JERSEY	AHISVW	AHISVW	AHISVW	AIPSW	AIPSW	Z	Z	Z	Z	Z
NEW MEXICO	AS	AS	AS	AS	AS	S	S	S	S	Z
NEW YORK	W	W	W	W	W	HRS	HRS	HRS	HRS	HRS
NORTH CAROLINA	GHSW	GHSW	GHSW	H	H	H	HS	HS	H	H
NORTH DAKOTA	ASW	ASW	ASW	Var	Var	S	S	S	Var	Var
OHIO	SWZ	AHP	AHP	AHIW	AHIW	-	R	R	Z	Z
OKLAHOMA	ASW	ASW	ASW	A	A	H	S	S	Z	Z
OREGON	AGPSVW	AGHPSVW	AGPSVW	AGHPV	AGP	6/	HR4/	4/	HR	5/
PENNSYLVANIA	ASW	ASW	ASW	ASW	ASW	RS	RS	RS	RS	RS
RHODE ISLAND	PSW	PSW	PSW	PSW	AHW	R	R	R	R	R
SOUTH CAROLINA	ISW	ISW	ISW	ISW	ISW	6/	HR	X	X	X
SOUTH DAKOTA	ISVW	ISVW	ISVW	*	*	R	R	R	*	*
TENNESSEE	AHS	AHS	AHS	*	*	HRS	HRS	HRS	*	*
TEXAS	SW	SW	SW	W	W	-	RS	RS	RS	RS
UTAH	-	AH	AH	AH	AH	-	H	H	H	H
VERMONT	AGHPSW	AGHPSW	AGHPSW	AGHVW	AI	HS	HRS	S	S	S
VIRGINIA	HZ	HZ	HZ	*	*	HRS	HRS	HRS	*	*
WASHINGTON	AHW	AHW	-	AH	AH	HRS	HRS	-	HRS	HRS
WEST VIRGINIA	APSW	APSW	APSW	-	-	X	X	X	X	X
WISCONSIN	AGISW	AGISW	AGISW	Z	Z	RS	RS	RS	R	R
WYOMING	SW	SW	SW	SW	SW	HRS	HRS	HRS	HRS	HRS
DIST. OF COL.	HISW	HISW	HISW	-	-	X	X	X	-	-
PUERTO RICO	-	Z	Z	Z	Z	-	X	X	X	X
AMERICAN SAMOA	-	Z	None	-	-	-	R	None	-	-
GUAM	*	PS	*	*	PS	-	S	*	*	S
VIRGIN ISLANDS	-	W	W	*	*	-	R	R	*	*

Footnotes are on following page.

FOOTNOTES FOR TABLE B-6

FA = Federal-Aid
- = Not Applicable
* = Not Reported
Var = Varies
Unk = Unknown

SKID IMPROVEMENT PROJECT SELECTION

A = Total Accidents
G = Roadway Geometrics
H = Included in Hazardous Locations
I = On-site investigation besides skid testing
P = Pavement texture or other pavement charcteristics besides skid number
S = Skid number
V = ADT
W = Wet pavement accidents
Z = Under development

NARROW BRIDGE PROJECT SELECTION

H = Included in hazardous locations
R = Included in roadside obstacle program
S = Separate program for narrow bridges
X = None
Z = Under development

OTHERS

1/ = Sign and Mark all Bridges
2/ = Accident History
3/ = Bridge Replacement Program
4/ = State-wide Bridge Program
5/ = Safer Off-System Program
6/ = Interstate Safety Program

APPENDIX C

FEDERAL FUNDS APPORTIONED AND OBLIGATED BY STATE

TABLE C-1a

RAIL-HIGHWAY ON SYSTEM
APPORTIONMENTS AND OBLIGATIONS
AS OF SEPTEMBER 30, 1977

STATE	TOTAL APPORTIONMENTS	OBLIGATIONS	%	UNOBLIGATED BALANCE	PERCENT OF FISCAL YEAR APPORTIONMENT OBLIGATED			
					74	75	76	77
ALABAMA	4,922,268.00	2,586,288.82	52	2,335,979.18	100	100	81	
ALASKA	5,368,245.00	1,464,457.00	27	3,903,788.00	100	66		
ARIZONA	2,708,084.00	1,127,552.64	41	1,580,531.36	100	100	27	
ARKANSAS	3,330,489.00	1,502,904.00	45	1,827,585.00	100	100	47	
CALIFORNIA	22,072,395.00	16,475,599.00	74	5,596,796.00	100	100	100	41
COLORADO	4,012,759.00	2,287,696.00	57	1,725,063.00	100	100	99	
CONNECTICUT	2,512,758.00	1,567,231.44	62	945,526.56	100	100	100	32
DELAWARE	1,254,519.00	525,330.00	41	729,189.00	100	100	33	
FLORIDA	7,906,407.00	6,391,565.00	80	1,514,842.00	100	100	100	56
GEORGIA	6,488,112.00	5,466,161.87	84	1,021,950.13	100	100	100	63
HAWAII	585,165.00			585,165.00				
IDAHO	2,206,904.00	1,803,454.00	81	403,450.00	100	100	100	57
ILLINOIS	12,941,428.00	10,650,411.55	82	2,291,016.45	100	100	100	59
INDIANA	6,471,567.00	3,389,618.00	52	3,081,949.00	100	100	80	
IOWA	4,920,839.00	3,697,696.55	75	1,223,142.45	100	100	100	42
KANSAS	4,531,286.00	4,056,900.63	89	474,785.37	100	100	100	76
KENTUCKY	4,354,432.00	2,001,645.66	45	2,352,786.34	100	100	51	
LOUISIANA	4,625,048.00	3,596,991.96	77	1,028,056.04	100	100	100	49
MAINE	1,824,054.00	1,357,216.74	74	466,837.26	100	100	100	40
MARYLAND	4,290,849.00	1,588,565.00	37	2,702,284.00	100	100	12	
MASSACHUSETTS	5,731,670.00	5,707,358.49	99	24,311.51	100	100	100	99
MICHIGAN	10,563,818.00	8,827,949.95	83	1,735,868.05	100	100	100	62
MINNESOTA	6,239,328.00	2,755,707.00	44	3,483,621.00	100	100	42	
MISSISSIPPI	3,545,017.00	1,860,770.00	52	1,684,247.00	100	100	82	
MISSOURI	6,982,537.00	6,950,175.29	99	32,361.71	100	100	100	99
MONTANA	3,189,488.00	2,013,379.00	63	1,176,109.00	100	100	100	14
NEBRASKA	3,415,085.00	2,269,998.92	66	1,145,086.08	100	100	100	21
NEVADA	2,144,812.00	2,144,812.00	100		100	100	100	100
NEW HAMPSHIRE	1,256,748.00	802,267.18	63	454,480.82	100	100	100	16
NEW JERSEY	7,153,917.00	4,247,261.10	59	2,906,655.90	100	100	100	5
NEW MEXICO	2,052,373.00	2,013,367.45	98	39,005.55	100	100	100	95
NEW YORK	19,446,511.00	13,730,221.00	70	5,716,290.00	100	100	100	32
NORTH CAROLINA	6,477,144.00	4,658,589.00	71	1,818,555.00	100	100	100	35
NORTH DAKOTA	2,183,658.00	2,183,658.00	100		100	100	100	100
OHIO	11,968,459.00	5,876,542.00	49	6,091,917.00	100	100	65	
OKLAHOMA	4,430,342.00	2,386,006.80	53	2,044,335.20	100	100	86	
OREGON	3,601,883.00	2,588,037.00	71	1,013,846.00	100	100	100	34
PENNSYLVANIA	13,152,257.00	4,722,047.00	35	8,430,210.00	100	100	7	
RHODE ISLAND	1,497,704.00	283,648.92	18	1,214,055.08	100	40		
SOUTH CAROLINA	3,399,630.00	1,683,421.21	49	1,716,208.79	100	100	67	
SOUTH DAKOTA	2,578,589.00	1,741,015.00	67	837,574.00	100	100	100	25
TENNESSEE	5,436,106.00	2,694,267.00	49	2,741,839.00	100	100	67	
TEXAS	16,411,100.00	7,139,250.77	43	9,271,849.23	100	100	41	
UTAH	2,253,057.00	2,047,433.00	90	205,624.00	100	100	100	79
VERMONT	1,126,855.00	474,256.74	42	652,598.26	100	100	34	
VIRGINIA	5,864,580.00	5,284,503.00	90	580,077.00	100	100	100	77
WASHINGTON	4,677,606.00	1,845,727.95	39	2,831,878.05	100	100	23	
WEST VIRGINIA	2,393,514.00	1,934,955.00	80	458,559.00	100	100	100	55
WISCONSIN	6,211,034.00	3,856,774.61	62	2,354,259.39	100	100	100	12
WYOMING	2,037,684.00	1,190,461.00	58	847,223.00	100	100	100	3
DIST. OF COL.	460,132.00	74,202.54	16	385,929.46	100	13		
PUERTO RICO	6,841.89	6,841.89	100		100			
TOTALS	275,217,087.89	177,531,791.67	64	97,685,296.22				

TABLE C-1b

RAIL-HIGHWAY OFF SYSTEM
APPORTIONMENTS AND OBLIGATIONS
AS OF SEPTEMBER 30, 1977

STATE	TOTAL APPORTIONMENTS	OBLIGATIONS	%	UNOBLIGATED BALANCE	PERCENT OF FISCAL YEAR APPORTIONMENT OBLIGATED			
					74	75	76	77
ALABAMA	1,605,034.00	25,893.00	1	1,579,141.00	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	2
ALASKA	2,653,211.00			2,653,211.00				
ARIZONA	1,075,494.08	188,730.00	17	886,764.00				18
ARKANSAS	1,065,986.00	134,627.00	12	931,359.00				13
CALIFORNIA	7,136,333.00	1,460,700.00	20	5,675,633.00				20
COLORADO	1,297,301.00			1,297,301.00				
CONNECTICUT	1,050,950.00	64,710.00	6	986,240.00				6
DELAWARE	406,849.00	191,565.00	47	215,284.00				47
FLORIDA	2,572,980.00	167,653.00	6	2,405,327.00				7
GEORGIA	2,074,370.00	379,422.00	18	1,694,948.00				18
HAWAII	440,895.00			440,895.00				
IDAHO	714,967.00	249,835.00	34	465,132.00				35
ILLINOIS	4,199,099.08	552,653.10	13	3,646,445.90				13
INDIANA	2,101,677.00	338,308.00	16	1,763,369.00				16
IOWA	1,584,340.00	225,900.00	14	1,358,440.00				14
KANSAS	1,471,397.00			1,471,397.00				
KENTUCKY	1,410,305.00	663,480.00	47	746,825.00				47
LOUISIANA	1,507,131.00	628,866.00	41	878,265.00				42
MAINE	586,785.00			586,785.00				
MARYLAND	1,394,517.00	283,894.00	20	1,110,623.00				20
MASSACHUSETTS	1,852,330.00	1,271,620.80	68	580,709.20				69
MICHIGAN	3,423,933.00	757,305.00	22	2,666,628.00				22
MINNESOTA	2,023,622.00	54,000.00	2	1,969,622.00				3
MISSISSIPPI	1,163,344.00			1,163,344.00				
MISSOURI	2,281,513.00			2,281,513.00				
MONTANA	1,029,362.00	1,029,362.00	100					100
NEBRASKA	1,094,238.00	79,690.00	7	1,014,548.00				7
NEVADA	695,476.00	65,360.00	9	630,116.00				9
NEW HAMPSHIRE	407,572.00			407,572.00				
NEW JERSEY	2,316,232.00	1,566,585.00	67	749,647.00				68
NEW MEXICO	909,299.00	551,890.80	60	357,408.20				61
NEW YORK	6,320,162.00	125,189.00	1	6,194,973.00				2
NORTH CAROLINA	2,105,029.00	374,490.00	17	1,730,539.00				18
NORTH DAKOTA	791,333.00	791,333.00	100					100
OHIO	3,885,968.00	1,924,560.00	49	1,961,408.00				50
OKLAHOMA	1,434,627.00			1,434,627.00				
OREGON	1,165,707.00	530,235.00	45	635,472.00				45
PENNSYLVANIA	4,291,665.00	855,000.00	19	3,436,665.00				20
RHODE ISLAND	485,714.00			485,714.00				
SOUTH CAROLINA	1,103,676.00	406,609.00	36	697,067.00				37
SOUTH DAKOTA	838,620.00			838,620.00				
TENNESSEE	1,765,250.00	42,390.00	2	1,722,860.00				2
TEXAS	5,352,978.00			5,352,978.00				
UTAH	726,420.00			726,420.00				
VERMONT	365,446.00			365,446.00				
VIRGINIA	1,875,916.00	1,065,340.00	56	810,576.00				57
WASHINGTON	1,522,471.00	122,157.00	8	1,400,314.00				8
WEST VIRGINIA	763,406.00	364,938.00	47	398,468.00				48
WISCONSIN	2,016,227.00	109,687.50	5	1,906,539.50				5
WYOMING	658,581.00	44,836.00	6	613,745.00				7
DIST. OF COL.	237,021.00			237,021.00				
PUERTO RICO	809,741.00			809,741.00				
TOTALS	92,062,500.00	17,688,814.20	19	74,373,685.80				

TABLE C-1c

PAVEMENT MARKING DEMONSTRATION PROGRAM
APPORTIONMENTS AND OBLIGATIONS
AS OF SEPTEMBER 30, 1977

STATE	TOTAL APPORTIONMENTS	OBLIGATIONS	%	UNOBLIGATED BALANCE	PERCENT OF FISCAL YEAR APPORTIONMENT OBLIGATED 74	75	76	77
ALABAMA	6,889,628.00	6,729,866.18	97	159,761.82	100	100	100	89
ALASKA	415,095.00	271,845.00	65	143,250.00	100	100	100	5
ARIZONA	1,772,483.00	1,269,610.67	71	502,872.33	100	100	96	
ARKANSAS	2,531,619.00	2,358,573.00	93	173,046.00	100	100	100	72
CALIFORNIA	11,265,586.00	10,643,935.00	94	621,651.00	100	100	100	78
COLORADO	2,611,842.00	2,223,487.70	85	388,354.30	100	100	100	32
CONNECTICUT	1,477,825.00	1,468,234.94	99	9,590.06	100	100	100	98
DELAWARE	728,592.00	555,300.00	76	173,292.00	100	100	90	
FLORIDA	6,812,278.00	6,468,321.00	94	343,957.00	100	100	100	79
GEORGIA	6,811,085.00	6,607,712.73	97	203,372.27	100	100	100	85
HAWAII	454,425.00	211,069.00	46	243,356.00	100	100	28	
IDAHO	2,091,356.00	1,414,131.00	67	677,225.00	100	100	65	
ILLINOIS	6,685,923.00	4,745,465.28	70	1,940,457.72	100	100	100	5
INDIANA	6,244,355.00	5,570,936.00	89	673,419.00	100	100	100	52
IOWA	3,967,498.00	3,910,951.28	98	56,546.72	100	100	100	94
KANSAS	3,478,542.00	3,194,938.53	91	283,603.47	100	100	100	64
KENTUCKY	5,716,359.00	3,471,831.00	60	2,244,528.00	100	100	41	
LOUISIANA	4,180,995.00	4,029,025.24	96	151,969.76	100	100	100	83
MAINE	2,405,235.00	2,289,306.49	95	115,928.51	100	100	100	73
MARYLAND	3,265,021.00	1,620,525.00	49	1,644,496.00	100	100	11	
MASSACHUSETTS	1,759,545.00	1,717,025.00	97	42,520.00	100	100	100	94
MICHIGAN	6,718,743.00	6,563,283.00	97	155,460.00	100	100	100	91
MINNESOTA	5,070,074.00	4,751,035.00	93	319,039.00	100	100	100	71
MISSISSIPPI	3,678,315.00	3,210,283.00	87	468,032.00	100	100	100	43
MISSOURI	6,517,986.00	5,780,035.89	88	737,950.11	100	100	100	44
MONTANA	1,711,541.00	1,390,858.00	81	320,683.00	100	100	100	4
NEBRASKA	2,067,684.00	1,765,060.97	85	302,623.03	100	100	100	40
NEVADA	893,901.00	831,569.00	93	62,332.00	100	100	100	70
NEW HAMPSHIRE	1,279,197.00	592,758.37	46	686,438.63	100	100	2	
NEW JERSEY	2,570,447.00	1,095,245.00	42	1,475,202.00	100	100	3	
NEW MEXICO	1,675,464.00	994,347.11	59	681,116.89	100	100	43	
NEW YORK	8,684,304.00	7,810,842.00	89	873,462.00	100	100	100	61
NORTH CAROLINA	8,927,303.00	5,062,560.00	56	3,864,743.00	100	100	30	
NORTH DAKOTA	1,467,113.00	1,055,010.00	71	412,103.00	100	100	77	
OHIO	12,113,601.00	11,134,389.00	91	979,212.00	100	100	100	66
OKLAHOMA	3,803,355.00	2,326,848.72	61	1,476,506.28	100	100	62	
OREGON	3,410,687.00	2,671,770.22	78	738,916.78	100	100	100	3
PENNSYLVANIA	10,264,812.00	9,268,755.00	90	996,057.00	100	100	100	51
RHODE ISLAND	341,386.00	341,386.00	100		100	100	100	100
SOUTH CAROLINA	6,493,354.00	5,102,086.05	78	1,391,267.95	100	100	88	
SOUTH DAKOTA	2,007,991.00	1,964,719.83	97	43,271.17	100	100	100	89
TENNESSEE	6,207,427.00	5,206,368.00	83	1,001,059.00	100	100	100	22
TEXAS	15,245,353.00	11,078,596.06	72	4,166,756.94	100	100	83	
UTAH	1,402,326.00	562,319.00	40	840,007.00	100	91		
VERMONT	796,956.00	520,829.57	65	276,126.43	100	100	55	
VIRGINIA	6,216,583.00	4,194,573.82	67	2,022,009.18	100	100	63	
WASHINGTON	4,838,090.00	2,498,234.63	51	2,339,855.37	100	100	18	
WEST VIRGINIA	2,164,555.00	1,983,470.00	91	181,085.00	100	100	100	60
WISCONSIN	9,552,426.00	7,793,087.19	81	1,759,338.81	100	100	89	
WYOMING	1,169,697.00	1,062,649.00	90	107,048.00	100	100	100	55
DIST. OF COL.	150,000.00	149,999.50	99	.50	100	100	100	99
PUERTO RICO	369,042.00	369,042.00	100		100	100	100	100
TOTALS	219,375,000.00	179,904,100.97	82	39,470,899.03				

TABLE C-1d

HIGH HAZARD LOCATIONS
APPORTIONMENTS AND OBLIGATIONS
AS OF SEPTEMBER 30, 1977

STATE	TOTAL APPORTIONMENTS	OBLIGATIONS	%	UNOBLIGATED BALANCE	PERCENT OF FISCAL YEAR APPORTIONMENT OBLIGATED			
					74	75	76	77
ALABAMA	3,520,333.00	3,482,585.25	98	37,747.75	100	100	97	NOT APPLICABLE
ALASKA	2,368,918.00	2,339,614.75	98	29,303.25	100	100	97	
ARIZONA	1,892,846.00	1,827,890.86	96	64,955.14	100	100	91	
ARKANSAS	2,909,382.00	2,903,832.00	99	5,550.00	100	100	99	
CALIFORNIA	18,430,558.10	18,023,300.37	97	407,257.73	100	100	93	
COLORADO	2,520,682.00	2,481,581.12	98	39,100.88	100	100	96	
CONNECTICUT	2,102,768.00	2,102,768.00	100		100	100	100	
DELAWARE	973,750.00	961,060.00	98	12,690.00	100	100	97	
FLORIDA	5,978,832.00	5,973,113.00	99	5,719.00	100	100	99	
GEORGIA	4,512,627.00	4,417,852.56	97	94,774.44	100	100	94	
HAWAII	1,515,784.50	1,264,545.00	83	251,239.50	100	100	57	
IDAHO	1,228,703.00	1,228,702.40	99	.60	100	100	99	
ILLINOIS	9,435,211.00	9,416,245.92	99	18,965.08	100	100	99	
INDIANA	4,777,753.00	3,791,080.34	79	986,672.66	100	100	45	
IOWA	3,451,867.00	3,325,917.96	96	125,949.04	100	100	90	
KANSAS	3,247,395.00	2,945,272.12	90	302,122.88	100	100	75	
KENTUCKY	3,061,786.00	2,957,994.72	96	103,791.28	100	100	91	
LOUISIANA	3,243,159.00	3,243,159.00	100		100	100	100	
MAINE	973,940.00	973,940.00	100		100	100	100	
MARYLAND	3,062,685.00	3,020,310.00	98	42,379.00	100	100	96	
MASSACHUSETTS	4,352,105.00	4,349,578.49	99	2,526.51	100	100	99	
MICHIGAN	7,699,640.00	7,676,713.55	99	22,926.45	100	100	99	
MINNESOTA	4,261,036.00	4,260,692.17	99	343.83	100	100	99	
MISSISSIPPI	2,421,581.00	995,524.00	41	1,426,057.00	100	43		
MISSOURI	4,769,486.00	4,769,485.32	99	.68	100	100	99	
MONTANA	1,380,485.00	1,331,508.30	96	48,976.70	100	100	91	
NEBRASKA	2,231,971.00	2,173,440.61	97	58,530.39	100	100	93	
NEVADA	973,750.00	970,463.00	99	3,287.00	100	100	99	
NEW HAMPSHIRE	973,750.00	973,750.00	100		100	100	100	
NEW JERSEY	5,415,203.00	4,285,940.40	79	1,129,262.60	100	100	44	
NEW MEXICO	1,349,628.00	1,332,263.43	98	17,364.57	100	100	97	
NEW YORK	14,119,047.00	14,080,253.00	99	38,794.00	100	100	99	
NORTH CAROLINA	4,684,102.00	4,684,102.00	100		100	100	100	
NORTH DAKOTA	1,543,723.00	1,543,530.54	99	192.46	100	100	99	
OHIO	8,861,578.00	3,712,871.00	41	5,148,707.00	100	45		
OKLAHOMA	3,203,355.00	2,986,955.41	93	216,399.59	100	100	82	
OREGON	2,628,320.00	2,606,723.53	99	21,596.47	100	100	98	
PENNSYLVANIA	9,716,746.00	9,713,991.41	99	2,754.59	100	100	99	
RHODE ISLAND	973,750.00	973,750.00	100		100	100	100	
SOUTH CAROLINA	2,593,858.00	2,593,858.00	100		100	100	100	
SOUTH DAKOTA	1,418,311.00	1,300,534.38	91	117,776.62	100	100	78	
TENNESSEE	3,783,288.00	1,914,527.00	50	1,868,761.00	100	68		
TEXAS	11,094,027.00	11,091,714.17	99	2,312.83	100	100	99	
UTAH	1,327,943.00	1,327,943.00	100		100	100	100	
VERMONT	973,750.00	973,750.00	100		100	100	100	
VIRGINIA	4,048,401.00	4,048,401.00	100		100	100	100	
WASHINGTON	3,402,911.00	3,402,911.00	100		100	100	100	
WEST VIRGINIA	1,668,798.00	1,668,798.00	100		100	100	100	
WISCONSIN	4,443,977.00	4,441,633.79	99	2,343.21	100	100	99	
WYOMING	973,750.00	973,750.00	100		100	100	100	
DIST. OF COL.	973,750.00	812,989.50	83	160,760.50	100	100	56	
PUERTO RICO	2,962,227.51	2,962,227.51	100		100	100	100	
TOTALS	200,433,231.11	187,615,338.88	93	12,817,892.23				

TABLE C-1e

ELIMINATION OF ROADSIDE OBSTACLES
APPORTIONMENTS AND OBLIGATIONS
AS OF SEPTEMBER 30, 1977

STATE	TOTAL APPORTIONMENTS	OBLIGATIONS	%	UNOBLIGATED BALANCE	PERCENT OF FISCAL YEAR APPORTIONMENT OBLIGATED			
					74	75	76	77
ALABAMA	3,082,214.00	3,053,098.76	99	29,115.24	100	100	98	NOT APPLICABLE
ALASKA	852,500.00	342,294.00	40	510,206.00	100	60		
ARIZONA	1,658,278.00	1,615,207.01	97	43,070.99	100	100	94	
ARKANSAS	1,412,021.00	1,412,021.00	100		100	100	100	
CALIFORNIA	11,621,266.90	8,810,835.26	75	2,810,431.64	100	100	53	
COLORADO	2,207,667.00	2,078,393.71	94	129,273.29	100	100	86	
CONNECTICUT	3,063,946.00	2,766,716.22	90	297,229.78	100	100	75	
DELAWARE	852,500.00	742,733.06	87	109,766.94	100	100	70	
FLORIDA	5,229,253.00	5,197,376.00	99	31,877.00	100	100	99	
GEORGIA	3,950,792.00	3,930,347.08	99	20,444.92	100	100	99	
HAWAII	1,084,800.50	1,035,945.00	95	48,855.50	100	100	89	
IDAHO	1,075,514.00	1,049,833.72	97	25,680.28	100	100	94	
ILLINOIS	8,259,957.00	8,220,135.14	99	39,821.86	100	100	99	
INDIANA	4,182,790.00	4,067,437.52	97	115,352.48	100	100	94	
IOWA	3,021,689.00	2,840,834.16	94	180,854.84	100	100	86	
KANSAS	2,842,740.00	2,838,879.00	99	3,861.00	100	100	99	
KENTUCKY	2,680,474.00	2,671,344.43	99	9,129.57	100	100	99	
LOUISIANA	2,839,444.00	2,838,570.88	99	873.12	100	100	99	
MAINE	852,596.00	440,100.00	51	412.496.00	100	87		
MARYLAND	2,681,298.00	2,681,298.00	100		100	100	100	
MASSACHUSETTS	3,810,283.00	3,810,283.00	100		100	100	100	
MICHIGAN	6,740,661.00	6,392,602.98	94	348,058.02	100	100	88	
MINNESOTA	3,730,682.00	3,730,477.36	99	204.64	100	100	99	
MISSISSIPPI	2,115,754.00	1,414,691.00	66	705,063.00	100	100	22	
MISSOURI	4,174,850.00	4,129,888.71	98	44,961.29	100	100	97	
MONTANA	1,208,599.00	1,145,999.02	94	62,599.98	100	100	88	
NEBRASKA	1,953,209.00	1,911,592.31	97	41,616.69	100	100	95	
NEVADA	852,500.00	852,500.00	100		100	100	100	
NEW HAMPSHIRE	852,500.00	852,500.00	100		100	100	100	
NEW JERSEY	4,740,842.00	4,505,527.70	95	235,314.30	100	100	88	
NEW MEXICO	1,449,363.00	1,201,445.11	82	247,917.89	100	100	51	
NEW YORK	12,360,884.00	11,966,415.40	96	394,468.60	100	100	93	
NORTH CAROLINA	4,101,380.00	4,080,230.00	99	21,150.00	100	100	99	
NORTH DAKOTA	1,351,228.00	1,308,809.25	96	42,418.75	100	100	93	
OHIO	7,758,025.00	7,551,798.00	97	206,227.00	100	100	94	
OKLAHOMA	2,804,510.00	1,442,161.00	51	1,362,349.00	100	86		
OREGON	2,301,847.00	2,114,145.44	91	187,701.56	100	100	81	
PENNSYLVANIA	8,506,607.00	7,992,360.77	93	514,246.23	100	100	86	
RHODE ISLAND	852,500.00	828,303.48	97	24,196.52	100	100	93	
SOUTH CAROLINA	2,270,895.00	2,270,895.00	100		100	100	100	
SOUTH DAKOTA	1,241,436.00	679,892.00	54	561,544.00	100	94		
TENNESSEE	3,312,000.00	3,228,776.00	97	83,224.00	100	100	94	
TEXAS	9,712,085.00	6,392,022.55	65	3,320,062.45	100	100	20	
UTAH	1,162,676.00	1,162,676.00	100		100	100	100	
VERMONT	852,500.00	834,232.07	97	18,267.93	100	100	95	
VIRGINIA	3,544,389.00	3,544,389.00	100		100	100	100	
WASHINGTON	2,981,747.00	2,981,747.00	100		100	100	100	
WEST VIRGINIA	1,460,939.00	1,393,700.00	95	67,239.00	100	100	89	
WISCONSIN	3,890,563.00	3,559,375.06	91	331,187.94	100	100	80	
WYOMING	852,500.00	828,002.00	97	24,498.00	100	100	93	
DIST. OF COL.	957,396.00	786,177.53	78	211,218.47	100	100	51	
PUERTO RICO	2,155,384.60	879,198.36	40	1,276,186.24	100	61		
TOTALS	169,556,475.00	154,406,213.05	91	15,150,261.95				

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HIGH HAZARD/ROADSIDE OBSTACLES
APPORTIONMENTS AND OBLIGATIONS
AS OF SEPTEMBER 30, 1977

STATE	TOTAL APPORTIONMENTS	OBLIGATIONS	%	UNOBLIGATED BALANCE	PERCENT OF FISCAL YEAR APPORTIONMENT OBLIGATED 74	75	76	77
ALABAMA	2,181,364.00	1,694,404.25	77	486,959.75	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	78
ALASKA	2,019,498.00	398,781.00	19	1,620,717.00				20
ARIZONA	1,180,374.00	1,091,973.00	92	88,401.00				93
ARKANSAS	1,419,863.00	1,419,863.00	100					100
CALIFORNIA	9,979,692.00	7,191,326.00	72	2,788,366.00				72
COLORADO	1,580,873.00	1,527,956.00	96	52,917.00				97
CONNECTICUT	1,463,022.00	1,358,883.28	92	104,138.72				93
DELAWARE	610,538.00	328,091.16	53	282,446.84				54
FLORIDA	3,677,152.00	3,594,097.00	97	83,055.00				98
GEORGIA	2,795,663.00	398,540.00	14	2,397,123.00				14
HAWAII	610,538.00	75,840.00	12	535,098.00				12
IDAHO	767,867.00	640,688.87	83	127,178.13				83
ILLINOIS	5,846,331.00	5,825,462.00	99	20,869.00				99
INDIANA	2,961,226.00	1,526,229.00	51	1,434,997.00				52
IOWA	2,122,859.00	2,108,850.30	99	14,008.70				99
KANSAS	2,025,975.00	157,500.00	7	1,868,475.00				8
KENTUCKY	1,898,212.00			1,898,212.00				
LOUISIANA	2,012,978.00	1,983,512.00	98	29,466.00				99
MAINE	610,538.00	605,367.11	99	5,570.89				99
MARYLAND	1,904,182.00	1,904,182.00	100					100
MASSACHUSETTS	2,723,279.00	2,617,793.44	96	105,485.56				96
MICHIGAN	4,790,481.00	2,888,237.00	60	1,902,244.00				60
MINNESOTA	2,634,764.00	2,628,117.00	99	6,647.00				99
MISSISSIPPI	1,499,898.00			1,499,898.00				
MISSOURI	2,958,811.00	1,808,280.00	51	1,150,531.00				61
MONTANA	853,245.00	853,245.00	100					100
NEBRASKA	1,375,777.00	655,526.25	47	720,250.75				48
NEVADA	911,538.00	846,859.00	92	65,079.00				93
NEW HAMPSHIRE	610,538.00	500,687.38	81	110,250.62				82
NEW JERSEY	3,363,849.00			3,363,849.00				
NEW MEXICO	1,323,974.00	722,930.03	54	601,043.97				55
NEW YORK	8,763,720.00	8,750,387.00	99	13,333.00				99
NORTH CAROLINA	2,925,755.00	1,307,816.00	44	1,617,939.00				45
NORTH DAKOTA	1,177,796.00	1,014,417.00	86	163,379.00				86
OHIO	5,493,156.00			5,493,156.00				
OKLAHOMA	1,984,236.00			1,984,236.00				
OREGON	1,658,134.00	992,813.00	59	665,321.00				60
PENNSYLVANIA	6,022,423.00	5,303,159.14	88	719,263.86				88
RHODE ISLAND	610,538.00	76,405.63	12	534,532.37				13
SOUTH CAROLINA	1,609,038.00	1,609,038.00	100					100
SOUTH DAKOTA	867,963.00	353,222.00	40	514,741.00				41
TENNESSEE	2,344,002.00	1,531,560.00	65	812,442.00				65
TEXAS	6,904,884.00	1,771,504.50	25	5,133,379.50				26
UTAH	828,341.00	687,122.92	82	141,218.08				83
VERMONT	610,538.00	41,250.02	6	569,687.98				7
VIRGINIA	2,510,409.00	2,510,409.00	100					100
WASHINGTON	2,118,507.00	515,415.52	24	1,603,091.48				24
WEST VIRGINIA	1,033,507.00	911,601.00	88	121,906.00				88
WISCONSIN	2,753,993.00	970,437.88	35	1,783,555.12				35
WYOMING	610,538.00	610,938.00	100					100
DIST. OF COL.	736,770.00			736,770.00				
PUERTO RICO	2,302,983.00	106,575.33	4	2,196,407.67				5
AMERICAN SAMOA	120,000.00			120,000.00				
GUAM	120,000.00			120,000.00				
VIRGIN ISLANDS	120,000.00	30,343.50	25	89,656.50				25
TOTALS	124,945,330.00	76,448,036.51	61	48,497,293.49				

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SAFER ROADS DEMONSTRATION
APPORTIONMENTS AND OBLIGATIONS
AS OF SEPTEMBER 30, 1977

STATE	TOTAL APPORTIONMENTS	OBLIGATIONS	%	UNOBLIGATED BALANCE	PERCENT OF FISCAL YEAR APPORTIONMENT OBLIGATED 74	75	76	77
ALABAMA	4,369,607.00	4,056,570.05	92	313,036.95	100	100	82	NOT APPLICABLE
ALASKA	1,227,970.00	406,957.00	33	821,013.00	100	31		
ARIZONA	2,349,957.00	1,864,582.10	79	485,374.90	100	100	47	
ARKANSAS	2,860,190.00	2,181,535.00	76	678,655.00	100	100	39	
CALIFORNIA	19,885,499.00	14,708,235.39	73	5,177,263.61	100	100	33	
COLORADO	3,129,230.00	2,940,230.51	93	188,999.49	100	100	85	
CONNECTICUT	2,925,754.00	2,074,963.14	70	850,790.86	100	100	25	
DELAWARE	1,227,970.00	1,227,970.00	100		100	100	100	
FLORIDA	7,418,371.00	7,179,248.00	96	239,123.00	100	100	92	
GEORGIA	5,601,092.00	5,598,953.28	99	2,138.72	100	100	99	
HAWAII	1,227,970.00	571,726.00	46	656,244.00	100	64		
IDAHO	1,525,292.00	1,400,937.00	91	124,355.00	100	100	79	
ILLINOIS	11,709,926.00	10,242,923.08	87	1,467,002.92	100	100	68	
INDIANA	5,929,926.00	5,269,694.00	88	660,232.00	100	100	71	
IOWA	4,284,695.00	4,180,791.06	97	103,903.94	100	100	94	
KANSAS	4,031,142.00	2,490,067.00	61	1,541,075.00	100	100	2	
KENTUCKY	3,800,196.00	3,651,313.60	96	148,882.40	100	100	90	
LOUISIANA	4,025,255.00	4,021,470.00	99	3,785.00	100	100	99	
MAINE	1,227,970.00	1,089,197.10	88	138,772.90	100	100	71	
MARYLAND	3,800,926.00	3,163,399.00	83	637,527.00	100	100	57	
MASSACHUSETTS	5,401,138.00	5,333,685.00	98	67,453.00	100	100	97	
MICHIGAN	9,556,083.00	9,278,670.60	97	277,412.40	100	100	93	
MINNESOTA	5,289,189.00	4,360,210.23	82	928,978.77	100	100	55	
MISSISSIPPI	3,005,679.00	2,525,941.00	84	479,738.00	100	100	59	
MISSOURI	5,919,666.00	5,278,500.23	89	641,165.77	100	100	72	
MONTANA	1,713,868.00	1,710,262.35	99	3,605.65	100	100	99	
NEBRASKA	2,770,420.00	2,367,990.35	85	402,429.65	100	100	62	
NEVADA	1,227,970.00	1,022,455.00	83	205,515.00	100	100	57	
NEW HAMPSHIRE	1,227,970.00	1,227,970.00	100		100	100	100	
NEW JERSEY	6,720,356.00	4,490,733.70	66	2,229,622.30	100	100	15	
NEW MEXICO	1,675,583.00	1,614,747.67	96	60,835.33	100	100	91	
NEW YORK	17,522,269.00	16,043,743.80	91	1,478,525.20	100	100	78	
NORTH CAROLINA	5,813,940.00	5,809,904.00	99	4,036.00	100	100	99	
NORTH DAKOTA	1,916,500.00	1,911,159.28	99	5,340.72	100	100	99	
OHIO	10,997,979.00	10,997,979.00	100		100	100	100	
OKLAHOMA	3,976,415.00	1,751,973.80	44	2,224,441.20	100	58		
OREGON	3,262,936.00	3,141,880.31	96	121,055.69	100	100	91	
PENNSYLVANIA	12,059,213.00	10,695,571.80	88	1,363,641.20	100	100	71	
RHODE ISLAND	1,227,970.00	565,287.46	46	662,682.54	100	63		
SOUTH CAROLINA	3,219,530.00	3,217,326.78	99	2,203.22	100	100	99	
SOUTH DAKOTA	1,760,743.00	1,515,537.42	86	245,205.58	100	100	64	
TENNESSEE	4,695,683.00	3,214,396.00	68	1,481,287.00	100	100	19	
TEXAS	13,769,716.00	8,825,971.07	64	4,943,744.93	100	100	8	
UTAH	1,648,445.00	1,640,017.63	99	8,427.37	100	100	99	
VERMONT	1,227,970.00	999,120.07	81	228,849.93	100	100	52	
VIRGINIA	5,024,601.00	3,952,540.45	78	1,072,060.55	100	100	45	
WASHINGTON	4,224,789.00	3,167,431.32	74	1,057,357.68	100	100	36	
WEST VIRGINIA	2,071,258.00	1,044,326.00	50	1,026,932.00	100	74		
WISCONSIN	5,515,894.00	5,485,059.44	99	30,834.56	100	100	99	
WYOMING	1,227,970.00	800,168.00	65	427,802.00	100	100	10	
DIST. OF COL.	1,227,970.00	1,101,011.07	89	126,958.93	100	100	73	
PUERTO RICO	2,451,439.00	1,619,266.85	66	832,172.15	100	100	13	
AMERICAN SAMOA	1,227,970.00	179,402.00	14	1,048,568.00	72			
GUAM	1,227,970.00	386,527.00	31	841,443.00	100	27		
VIRGIN ISLANDS	1,227,970.00	1,227,970.00	100		100	100	100	
TOTALS	245,594,000.00	206,825,498.99	84	38,768,501.01				

TABLE C-1h

SAFER OFF-SYSTEM ROADS
APPORTIONMENTS AND OBLIGATIONS
AS OF SEPTEMBER 30, 1977

STATE	TOTAL APPORTIONMENTS	OBLIGATIONS	%	UNOBLIGATED BALANCE	PERCENT OF FISCAL YEAR APPORTIONMENT OBLIGATED 74	75	76	77
ALABAMA	3,582,095.00			3,582,095.00	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	
ALASKA	7,283,927.00			7,283,927.00				
ARIZONA	2,962,824.00			2,962,824.00				
ARKANSAS	2,709,273.00	1,456,675.00	53	1,252,598.00				54
CALIFORNIA	13,658,499.00			13,658,499.00				
COLORADO	3,464,088.00	111,978.21	3	3,352,109.79				3
CONNECTICUT	1,842,319.00			1,842,319.00				
DELAWARE	360,236.00	149,746.04	41	210,489.96				42
FLORIDA	5,333,634.00	505,275.00	9	4,828,359.00				9
GEORGIA	4,432,152.00			4,432,152.00				
HAWAII	507,736.00			507,736.00				
IDAHO	2,193,208.00	321,249.63	14	1,871,958.37				15
ILLINOIS	7,868,061.00			7,868,061.00				
INDIANA	4,304,829.00			4,304,829.00				
IOWA	3,384,646.00			3,384,646.00				
KANSAS	3,849,468.00			3,849,468.00				
KENTUCKY	3,039,964.00			3,039,964.00				
LOUISIANA	3,238,842.00			3,238,842.00				
MAINE	1,256,153.00	78,136.24	6	1,178,016.76				6
MARYLAND	2,389,120.00	119,360.00	4	2,269,760.00				5
MASSACHUSETTS	3,323,025.00			3,323,025.00				
MICHIGAN	6,601,197.00	2,295,694.00	34	4,305,503.00				35
MINNESOTA	4,212,158.00			4,212,158.00				
MISSISSIPPI	2,609,607.00	52,220.00	2	2,557,387.00				2
MISSOURI	4,668,250.00			4,668,250.00				
MONTANA	3,070,631.00			3,070,631.00				
NEBRASKA	2,785,831.00			2,785,831.00				
NEVADA	2,126,147.00	217,816.00	10	1,908,331.00				10
NEW HAMPSHIRE	697,674.00			697,674.00				
NEW JERSEY	3,972,867.00			3,972,867.00				
NEW MEXICO	2,637,391.00			2,637,391.00				
NEW YORK	10,827,042.00			10,827,042.00				
NORTH CAROLINA	4,580,356.00			4,580,356.00				
NORTH DAKOTA	2,269,681.00	925,310.42	40	1,344,370.58				41
OHIO	7,295,438.00	366,528.00	5	6,928,910.00				5
OKLAHOMA	3,587,568.00			3,587,568.00				
OREGON	3,575,676.00			3,575,676.00				
PENNSYLVANIA	8,266,244.00			8,266,244.00				
RHODE ISLAND	537,783.00			537,783.00				
SOUTH CAROLINA	2,459,861.00			2,459,861.00				
SOUTH DAKOTA	2,163,254.00	228,559.87	10	1,934,694.13				11
TENNESSEE	3,690,904.00			3,690,904.00				
TEXAS	12,054,911.00			12,054,911.00				
UTAH	2,181,692.00	1,230,751.00	56	950,941.00				56
VERMONT	560,622.00			560,622.00				
VIRGINIA	3,638,776.00	1,240,809.93	34	2,397,966.07				34
WASHINGTON	3,624,306.00			3,624,306.00				
WEST VIRGINIA	1,702,923.00			1,702,923.00				
WISCONSIN	4,325,962.00			4,325,962.00				
WYOMING	1,763,468.00			1,763,468.00				
DIST. OF COL.	353,865.00			353,865.00				
PUERTO RICO	1,673,816.00			1,673,816.00				
TOTALS	195,500,000.00	9,300,109.34	4	186,199,890.66				

TABLE C-2a

Rail Highway Crossings - On System
Distribution of Projects by Cost Range

STATE	SUMMARIES FOR FISCAL YEARS 1974 THRU 1977						FISCAL YEAR 1977	
	NO. OF PROJ	NUMBER OF PROJECTS BY COST RANGES ($1000)				FEDERAL FUNDS OBLIGATED ($1000)	NO. OF NEW PROJ	FEDERAL FUNDS OBLIGATED (dollars)
		0-50	50-100	100-250	OVER 250			
Alabama	51	32	14	5	0	2,584	7	340,590
Alaska	5	4	0	0	1	1,463	3	56,700
Arizona	22	12	9	1	0	1,125	3	502,510
Arkansas	69	66	3	0	0	1,502	19	318,459
California	120	64	37	9	10	16,473	96	7,849,642
Colorado	19	13	1	2	3	2,285	13	49,522
Connecticut	34	23	7	3	1	1,566	24	728,186
Delaware	31	28	1	2	0	524	14	223,510
Florida	59	24	19	12	4	6,390	25	2,545,913
Georgia	158	142	11	3	2	5,464	82	2,190,669
Hawaii	0	0	0	0	0	0	0	0
Idaho	37	20	15	2	0	1,802	30	1,299,645
Illinois	365	331	20	13	4	10,648	315	4,790,500
Indiana	84	61	14	6	3	3,388	52	1,552,432
Iowa	131	118	8	3	2	3,695	68	1,675,515
Kansas	81	44	35	2	0	4,055	52	2,443,169
Kentucky	51	47	1	2	1	1,999	47	1,027,128
Louisiana	55	28	16	10	1	3,595	16	1,036,213
Maine	51	43	7	1	0	1,356	19	1,010,368
Maryland	23	16	4	2	1	1,587	12	465,782
Massachusetts	9	2	1	4	2	5,706	3	2,460,605
Michigan	131	73	31	21	6	8,826	53	3,463,800
Minnesota	5	1	1	1	2	2,753	1	901,642
Mississippi	61	55	6	0	0	1,860	0	97,606
Missouri	40	30	4	0	6	6,947	3	3,108,088
Montana	14	6	2	4	2	2,010	5	872,756
Nebraska	42	31	8	2	1	2,268	19	641,505
Nevada	18	6	4	5	3	2,143	7	923,050
New Hampshire	12	5	5	2	0	801	3	413,514
New Jersey	89	56	21	11	1	4,245	67	4,059,251
New Mexico	28	17	4	6	1	2,012	16	1,341,641
New York	62	27	18	10	7	13,727	32	9,277,728
North Carolina	204	201	2	0	1	4,657	104	3,470,134
North Dakota	14	5	1	5	3	2,181	6	850,500
Ohio	77	59	7	7	4	5,873	22	3,030,457
Oklahoma	103	87	14	1	1	2,335	84	1,036,441
Oregon	72	54	9	9	0	2,586	41	1,576,282
Pennsylvania	95	72	16	5	2	4,719	48	2,284,525
Rhode Island	3	0	1	2	0	283	0	111,580
South Carolina	59	54	5	0	0	1,682	25	801,323
South Dakota	131	123	4	4	0	1,740	90	675,376
Tennessee	92	85	7	0	0	2,693	40	1,355,515
Texas	177	163	11	1	2	7,137	59	2,285,347
Utah	19	9	3	4	3	2,046	7	805,371
Vermont	21	19	1	1	0	473	7	74,012
Virginia	101	81	14	4	2	5,282	27	2,117,888
Washington	101	87	13	1	0	1,845	75	830,214
West Virginia	61	49	12	0	0	1,934	26	797,789
Wisconsin	128	116	10	0	2	3,855	41	1,155,785
Wyoming	35	30	5	0	0	1,190	5	294,305
Dist. of Col.	2	2	0	0	0	74	0	0
Puerto Rico	1	1	0	0	0	6	-1	-760
TOTALS	3456	2722	462	188	84	177,440	1836	81,226,153

TABLE C-2b

Pavement Marking Demonstration
Distribution of Projects by Cost Range

STATE	SUMMARIES FOR FISCAL YEARS 1974 THRU 1977						FISCAL YEAR 1977	
	NO. OF PROJ	NUMBER OF PROJECTS BY COST RANGES ($1000)				FEDERAL FUNDS OBLIGATED ($1000)	NO. OF NEW PROJ	FEDERAL FUNDS OBLIGATED (dollars)
		0-50	50-100	100-250	OVER 250			
Alabama	67	27	21	15	4	6,727	19	2,464,162
Alaska	3	2	0	0	1	271	13	271,845
Arizona	8	4	3	0	1	1,268	0	25,238
Arkansas	19	4	1	13	1	2,356	3	513,013
California	152	84	51	14	3	10,642	121	5,423,855
Colorado	31	16	7	7	1	2,222	21	787,681
Connecticut	22	7	12	3	0	1,466	11	405,264
Delaware	6	1	3	2	0	554	1	-11,500
Florida	106	63	31	9	3	6,465	74	4,941,196
Georgia	35	6	6	14	9	6,605	7	1,961,530
Hawaii	4	1	3	0	0	210	2	100,990
Idaho	19	10	4	4	1	1,411	15	387,716
Illinois	68	40	14	11	3	4,743	33	656,790
Indiana	81	53	22	1	5	5,568	35	1,162,134
Iowa	50	25	13	11	1	3,909	15	891,840
Kansas	18	9	3	2	4	3,192	9	600,257
Kentucky	9	0	1	0	8	3,471	6	1,849,429
Louisiana	31	6	10	11	4	4,027	5	833,941
Maine	5	1	0	1	3	2,288	1	623,406
Maryland	26	14	6	6	0	1,619	18	811,950
Massachusetts	4	0	0	2	2	1,716	2	742,637
Michigan	3	0	0	0	3	6,562	0	1,600,575
Minnesota	3	0	1	0	2	4,751	1	800,000
Mississippi	54	45	7	1	1	3,209	39	357,384
Missouri	23	14	2	2	5	5,777	8	4,665,759
Montana	5	2	1	0	2	1,390	3	658,000
Nebraska	18	8	2	7	1	1,763	8	899,186
Nevada	9	6	1	1	1	830	5	325,860
New Hampshire	8	4	2	2	0	592	3	262,955
New Jersey	13	3	4	6	0	1,094	5	471,865
New Mexico	24	18	5	0	1	993	8	589,858
New York	80	40	23	11	6	7,808	32	2,131,032
North Carolina	43	15	6	18	4	5,061	25	2,177,791
North Dakota	6	2	0	2	2	1,053	1	274,990
Ohio	127	48	49	26	4	11,131	47	1,908,289
Oklahoma	102	87	11	4	0	2,326	54	132,445
Oregon	68	53	6	8	1	2,669	25	866,652
Pennsylvania	61	17	19	14	11	9,265	15	1,951,660
Rhode Island	3	0	2	1	0	341	2	151,000
South Carolina	33	5	9	12	7	5,099	12	1,836,396
South Dakota	16	10	1	2	3	1,963	6	816,995
Tennessee	42	7	2	18	5	5,215	11	738,715
Texas	68	31	11	10	16	11,076	28	2,032,220
Utah	24	23	1	0	0	561	12	216,147
Vermont	10	7	2	1	0	520	9	47,714
Virginia	39	9	16	10	4	4,193	18	1,897,743
Washington	66	50	9	6	1	2,497	34	713,658
West Virginia	11	4	3	3	1	1,032	10	275,026
Wisconsin	76	45	6	20	4	7,790	41	2,747,578
Wyoming	6	2	0	3	1	7,061	3	128,750
Dist. of Col.	2	1	0	1	0	149	2	150,000
Puerto Rico	2	0	0	2	0	369	1	176,065
TOTALS	1809	929	422	317	141	179,810	869	57,440,672

TABLE C-2c

High Hazard Locations
Distribution of Projects by Cost Range

STATE	SUMMARIES FOR FISCAL YEARS 1974 THRU 1977						FISCAL YEAR 1977	
	NO. OF PROJ	NUMBER OF PROJECTS BY COST RANGES ($1000)				FEDERAL FUNDS OBLIGATED ($1000)	NO. OF NEW PROJ	FEDERAL FUNDS OBLIGATED (dollars)
		0-50	50-100	100-250	OVER 250			
Alabama	34	18	3	9	4	3,480	0	-1,928
Alaska	20	9	3	7	1	2,338	4	346,034
Arizona	8	1	3	1	3	1,825	5	972,131
Arkansas	4	0	0	0	4	2,902	-1	0
California	207	101	56	35	15	18,022	52	2,740,897
Colorado	16	4	3	6	3	2,479	-1	658,488
Connecticut	76	66	4	6	0	2,101	2	351,760
Delaware	13	7	3	2	1	959	2	23,338
Florida	79	38	27	11	3	5,972	8	526,161
Georgia	103	86	9	6	2	4,416	33	1,930,770
Hawaii	12	5	5	1	1	1,263	7	793,854
Idaho	17	9	5	3	0	1,227	0	-1
Illinois	39	13	5	11	10	9,414	-1	-8,435
Indiana	23	10	3	4	6	3,788	5	760,616
Iowa	11	1	1	2	7	3,323	2	-78,106
Kansas	23	11	3	6	3	2,943	12	308,709
Kentucky	55	44	2	6	3	2,955	33	2,068,469
Louisiana	13	7	1	1	4	3,241	0	0
Maine	15	11	0	3	1	973	0	0
Maryland	8	4	1	2	1	3,019	1	45,047
Massachusetts	24	3	6	12	3	4,347	8	247,564
Michigan	51	20	6	12	13	7,674	6	484,612
Minnesota	38	14	9	10	5	4,258	1	34,259
Mississippi	13	9	0	3	1	994	5	709,615
Missouri	37	15	9	8	5	4,765	11	1,329,207
Montana	34	28	0	5	1	1,330	1	-2,772
Nebraska	37	25	8	2	2	2,170	7	124,669
Nevada	6	3	0	1	2	968	0	-3,287
New Hampshire	7	2	1	2	2	971	4	255,832
New Jersey	31	15	4	6	6	4,282	17	1,309,943
New Mexico	27	22	2	2	1	1,330	2	-17,365
New York	93	44	8	20	21	14,077	33	2,763,635
North Carolina	149	128	13	4	4	4,687	65	2,056,479
North Dakota	9	1	3	4	0	1,542	0	5,526
Ohio	160	136	19	4	1	3,711	103	1,879,433
Oklahoma	53	37	7	6	3	2,985	23	798,551
Oregon	80	66	6	8	0	2,605	3	211,368
Pennsylvania	176	105	41	24	6	9,712	2	5,711
Rhode Island	3	0	1	1	1	973	0	0
South Carolina	51	34	9	6	2	2,592	-1	0
South Dakota	13	7	1	4	1	1,299	-1	-9,686
Tennessee	26	16	5	3	2	1,912	18	1,153,319
Texas	161	112	20	17	12	11,089	72	4,163,387
Utah	16	11	2	0	3	1,327	5	18,899
Vermont	8	3	2	1	2	972	0	0
Virginia	128	107	11	8	2	4,046	25	249,896
Washington	73	46	21	6	0	3,401	3	254,454
West Virginia	11	4	0	5	2	1,668	2	438,597
Wisconsin	85	54	22	6	3	4,440	0	125,589
Wyoming	11	2	7	1	1	972	4	181,597
Dist. of Col.	14	10	1	2	1	812	6	319,434
Puerto Rico	5	1	0	2	2	2,961	2	1,071,723
Virgin Islands								
TOTALS	2406	1525	381	317	183	187,507	589	31,600,989

TABLE C-2d

Elimination of Roadside Obstacles
Distribution of Projects by Cost Range

STATE	SUMMARIES FOR FISCAL YEARS 1974 THRU 1977						FISCAL YEAR 1977	
	NO. OF PROJ	NUMBER OF PROJECTS BY COST RANGES ($1000)				FEDERAL FUNDS OBLIGATED ($1000)	NO. OF NEW PROJ	FEDERAL FUNDS OBLIGATED (dollars)
		0-50	50-100	100-250	OVER 250			
Alabama	16	8	3	0	5	3,051	6	819,317
Alaska	4	3	0	0	1	341	0	-
Arizona	4	1	1	0	2	1,614	0	-32,953
Arkansas	2	0	1	0	1	1,411	1	0
California	88	36	21	27	4	8,808	46	5,463,690
Colorado	28	15	4	7	2	2,077	5	548,450
Connecticut	16	6	2	4	4	2,765	2	-8,951
Delaware	11	6	3	2	0	742	3	76,197
Florida	45	18	11	12	5	5,195	3	261,761
Georgia	29	18	2	2	7	3,928	19	745,364
Hawaii	7	3	0	3	1	1,034	3	493,578
Idaho	14	7	4	2	1	1,048	4	64,864
Illinois	49	13	13	14	9	8,215	4	437,708
Indiana	20	6	2	5	7	4,066	6	426,011
Iowa	29	8	8	11	2	2,839	15	1,144,635
Kansas	4	1	0	0	3	2,838	1	0
Kentucky	26	13	4	6	3	2,669	-43	409,069
Louisiana	20	0	8	10	2	2,835	2	771,559
Maine	8	5	0	3	0	439	4	144,990
Maryland	20	10	1	5	4	2,679	5	63,521
Massachusetts	9	0	1	2	6	3,805	2	170,175
Michigan	25	8	6	7	4	6,391	1	122,620
Minnesota	27	8	7	7	5	3,728	1	37,318
Mississippi	13	8	0	2	3	1,413	2	-24,493
Missouri	100	73	18	8	1	4,127	18	253,416
Montana	22	17	2	1	2	1,143	1	348,555
Nebraska	27	17	7	2	1	1,909	3	-23,491
Nevada	6	0	4	1	1	851	0	0
New Hampshire	6	0	2	4	0	851	1	142,938
New Jersey	44	27	2	11	4	4,504	10	1,057,193
New Mexico	16	8	3	4	1	1,200	5	73,953
New York	64	22	12	12	18	11,963	22	3,732,014
North Carolina	19	8	7	2	2	4,079	0	1,278,965
North Dakota	9	1	3	3	2	1,306	0	10,636
Ohio	108	63	19	20	6	7,549	60	3,375,228
Oklahoma	8	1	3	2	2	1,440	0	375,210
Oregon	25	16	2	5	3	2,113	10	131,127
Pennsylvania	130	83	24	16	7	7,990	14	1,950,848
Rhode Island	2	0	0	0	2	828	0	37,957
South Carolina	21	5	9	4	3	2,269	-2	13,844
South Dakota	17	13	2	2	0	679	9	474,879
Tennessee	19	2	1	15	1	3,227	9	932,430
Texas	109	77	13	13	6	6,390	52	4,041,745
Utah	35	30	3	2	0	1,161	1	150,649
Vermont	19	14	3	2	0	832	8	431,401
Virginia	122	103	11	8	0	3,543	28	993,928
Washington	52	40	5	6	1	2,979	29	497,059
West Virginia	12	6	0	5	1	1,393	2	583,146
Wisconsin	44	30	6	4	4	3,557	0	65,499
Wyoming	19	11	8	0	0	827	3	43,285
Dist. of Col.	5	1	1	1	2	784	3	118,284
Puerto Rico	7	3	0	4	0	878	1	161,656
Virgin Islands	0	0	0	0	0	0	0	0
TOTALS	1583	872	272	288	151	154,309	379	33,365,606

TABLE C-2e

Safer Roads Demonstration Program
Distribution of Projects by Cost Range

STATE	SUMMARIES FOR FISCAL YEARS 1974 THRU 1977						FISCAL YEAR 1977	
	NO. OF PROJ	NUMBER OF PROJECTS BY COST RANGES ($1000)				FEDERAL FUNDS OBLIGATED ($1000)	NO. OF NEW PROJ	FEDERAL FUNDS OBLIGATED (dollars)
		0-50	50-100	100-250	OVER 250			
Alabama	77	56	12	8	1	4,054	42	1,497,265
Alaska	7	5	1	1	0	405	4	145,489
Arizona	35	17	15	3	0	1,863	4	783,208
Arkansas	58	46	10	2	0	2,179	17	545,101
California	203	120	34	39	10	14,706	157	5,825,828
Colorado	69	53	10	3	3	2,938	9	239,074
Connecticut	107	103	2	1	1	2,073	5	218,538
Delaware	13	6	5	1	1	1,226	3	68,337
Florida	76	46	7	16	7	7,177	15	1,341,476
Georgia	174	159	7	8	0	5,597	17	40,055
Hawaii	10	6	2	2	0	570	4	182,426
Idaho	36	30	3	2	1	1,398	33	686,047
Illinois	88	42	17	18	11	10,239	56	2,191,365
Indiana	101	80	13	2	6	5,268	51	1,735,621
Iowa	110	78	25	7	0	4,179	53	1,120,644
Kansas	75	54	14	7	0	2,489	39	102,133
Kentucky	146	144	2	0	0	3,650	47	1,329,122
Louisiana	49	23	18	4	4	4,019	8	441,108
Maine	27	21	2	3	1	1,088	16	999,644
Maryland	67	53	6	6	2	3,161	50	1,510,870
Massachusetts	15	5	2	5	3	5,331	4	1,536,462
Michigan	112	62	23	18	9	9,277	48	1,086,434
Minnesota	3	1	0	0	2	4,359	-1	377,253
Mississippi	88	87	0	0	1	2,525	53	-148,029
Missouri	167	150	6	6	5	5,277	24	1,523,200
Montana	4	2	0	0	2	1,709	0	62,377
Nebraska	37	18	13	6	0	2,366	13	652,747
Nevada	27	21	2	4	0	1,021	7	166,505
New Hampshire	5	0	0	4	1	1,227	3	827,813
New Jersey	60	39	3	13	5	4,498	21	1,016,366
New Mexico	64	57	6	1	0	1,613	42	899,279
New York	383	323	33	20	7	16,042	152	9,805,827
North Carolina	195	188	7	0	0	5,808	27	976,253
North Dakota	16	4	6	4	2	1,908	-1	41,000
Ohio	58	27	13	16	2	10,996	19	3,052,069
Oklahoma	84	75	7	2	0	1,750	17	408,898
Oregon	98	78	12	7	1	3,141	22	703,802
Pennsylvania	354	311	36	14	3	10,694	95	2,329,135
Rhode Island	2	0	-	1	1	564	1	369,554
South Carolina	71	53	10	7	1	3,215	29	1,395,614
South Dakota	53	47	5	1	0	1,513	14	496,902
Tennessee	219	215	3	1	0	3,214	67	1,430,428
Texas	145	98	20	21	6	8,824	59	5,202,835
Utah	39	33	1	3	2	1,638	2	605,612
Vermont	34	28	6	0	0	999	14	257,060
Virginia	95	72	13	10	0	3,951	29	417,924
Washington	87	58	25	4	0	3,166	29	1,009,295
West Virginia	45	40	5	0	0	1,043	31	472,207
Wisconsin	122	82	25	15	0	5,484	1	55,664
Wyoming	19	17	0	2	0	800	13	396,265
Dist. of Col.	1	0	0	0	0	1,101	0	-35,979
Puerto Rico	19	10	0	8	2	1,618	5	-7,229
American Samoa	5	4	1	0	0	178	0	11,430
Guam	6	2	4	0	0	386	2	136,642
Virgin Islands	3	0	1	0	2	1,226	2	134,222
TOTALS	4273	3349	493	326	105	206,731	1473	55,710,189

TABLE C-3a

RAIL-HIGHWAY ON-SYSTEM

FEDERAL FUNDS OBLIGATED BY HIGHWAY SYSTEM ($1,000)

AS OF SEPTEMBER 30, 1977

STATE	FEDERAL-AID-SYSTEM				STATE DESIGNATED SYSTEM			TOTAL
	PRIMARY	SECONDARY	URBAN	COMBINED	STATE	LOCAL	COMBINED	
ALABAMA	822.3	1,116.3	629.3	18.4	1,370.1	1,153.1	63.1	2,586.3
ALASKA	1,377.7	86.7			1,464.5			1,464.5
ARIZONA	283.0	609.2	35.6	199.7	716.1	286.3	125.1	1,127.6
ARKANSAS	473.7	915.5	104.7	9.0	1,493.9		9.0	1,502.9
CALIFORNIA	4,119.8	5,073.8	7,213.4	68.6	7,243.8	9,231.8		16,475.6
COLORADO	2,247.8	4.7	35.2		2,257.2	30.5		2,287.7
CONNECTICUT	584.8	322.0	647.0	13.5	902.8	664.4		1,567.2
DELAWARE	76.7	208.0	97.2	143.5	492.8		32.5	525.3
FLORIDA	2,615.8	3,581.1	194.7		6,349.0	42.6		6,391.6
GEORGIA	1,550.1	3,380.9	535.2		2,431.1	3,035.1		5,466.2
HAWAII								
IDAHO	698.4	586.5	393.5	125.1	1,679.4	102.6	21.4	1,803.5
ILLINOIS	5,847.8	3,493.0	1,164.9	144.7	6,023.9	4,255.5	371.0	10,650.4
INDIANA	944.9	1,487.1	904.0	53.6	2,010.3	1,325.7	53.6	3,389.6
IOWA	1,505.4	1,285.9	519.7	386.7	2,023.9	1,448.8	225.0	3,697.7
KANSAS	2,505.9	845.8	704.8		3,850.5	206.0		4,056.5
KENTUCKY	329.8	1,113.5	457.9	100.4	2,001.6			2,001.6
LOUISIANA	2,058.5	1,076.3	462.1		3,597.0			3,597.0
MAINE	481.6	224.6	99.6	551.4	823.4		533.8	1,357.2
MARYLAND	1,086.2	138.3	364.1		1,199.1	389.5		1,588.6
MASSACHUSETTS	95.0		773.5	4,838.9	107.7	487.3	5,110.4	5,707.4
MICHIGAN	3,562.4	2,265.0	2,987.2	13.4	4,611.9	4,177.6	38.5	8,827.9
MINNESOTA	319.2	1,182.0		1,254.5	566.9	934.3	1,254.5	2,755.7
MISSISSIPPI	265.4	1,309.2	286.1		1,076.4	784.4		1,860.8
MISSOURI	735.5	4,526.4	1,688.2		6,950.2			6,950.2
MONTANA	819.6	267.9	30.5	895.3	1,118.1		895.3	2,013.4
NEBRASKA	1,130.2	700.5	331.8	107.5	1,578.4	691.6		2,270.0
NEVADA	626.0	1,047.5	436.4	34.9	2,109.9	34.9		2,144.8
NEW HAMPSHIRE	362.2	379.1	32.9	28.1	802.3			802.3
NEW JERSEY	219.5	468.5	3,546.9	12.4	427.7	3,819.6		4,247.3
NEW MEXICO	321.8	264.1	1,036.6	390.8	624.7	1,388.7		2,013.4
NEW YORK	3,136.1	2,803.1	1,336.7	6,454.3	9,022.8	2,768.7	1,938.7	13,730.2
NORTH CAROLINA	1,541.7	2,723.1	191.1	202.7	4,604.1	23.0	31.5	4,658.6
NORTH DAKOTA	656.4	737.2	79.4	710.6	656.4	815.6	710.6	2,183.7
OHIO	227.1	5,462.0	167.7	19.8	5,677.0	199.5		5,876.5
OKLAHOMA	234.6	252.0	1,782.7	116.7	303.4	2,082.6		2,386.0
OREGON	129.3	372.2	2,085.9	.7	326.6	2,261.4		2,588.0
PENNSYLVANIA	1,405.0	1,539.4	577.8	1,199.8	3,755.7		966.4	4,722.0
RHODE ISLAND	58.1	122.3	103.3		283.6			283.6
SOUTH CAROLINA	472.8	980.4	126.1	104.1	1,674.4		9.0	1,683.4
SOUTH DAKOTA	939.1	91.2	692.7	18.0	1,690.1	33.0	18.0	1,741.0
TENNESSEE	435.1	1,946.4	312.8		1,352.2	1,342.0		2,694.3
TEXAS	1,005.5	3,230.4	2,867.4	36.0	6,505.6	633.6		7,139.3
UTAH	45.0	1,916.0	86.4		2,047.4			2,047.4
VERMONT	54.7	267.2		152.3	235.7	86.2	152.3	474.3
VIRGINIA	1,515.3	3,769.2			5,284.5			5,284.5
WASHINGTON	89.7	643.6	1,027.0	85.4	46.0	1,799.7		1,845.7
WEST VIRGINIA	574.5	1,257.1	89.9	13.5	1,861.5	59.9	13.5	1,935.0
WISCONSIN	1,313.1	1,814.6	712.4	16.6	2,377.9	1,462.7	16.2	3,856.8
WYOMING	195.2	815.6	179.6		1,190.5			1,190.5
DIST. OF COL.		74.2			74.2			74.2
PUERTO RICO				6.8			6.8	6.8
AMERICAN SAMOA								
GUAM								
VIRGIN ISLANDS								
TOTAL	32,095.6	68,776.6	38,131.8	18,527.9	116,874.4	48,061.1	12,596.3	177,531.8

COLUMNS MAY NOT ADD DUE TO ROUNDING.

TABLE C-3b

RAIL-HIGHWAY OFF-SYSTEM

FEDERAL FUNDS OBLIGATED BY HIGHWAY SYSTEM ($1,000)

AS OF SEPTEMBER 30, 1977

STATE	STATE DESIGNATED SYSTEM			TOTAL
	STATE	LOCAL	COMBINED	
ALABAMA		25.9		25.9
ALASKA				
ARIZONA	188.7			188.7
ARKANSAS	134.6			134.6
CALIFORNIA		1,460.7		1,460.7
COLORADO				
CONNECTICUT	13.0	51.6		64.7
DELAWARE	191.6			191.6
FLORIDA		66.0	101.7	167.7
GEORGIA	32.6	346.8		379.4
HAWAII				
IDAHO			249.8	249.8
ILLINOIS			552.7	552.7
INDIANA	1.8	335.6	.9	338.3
IOWA		225.9		225.9
KANSAS				
KENTUCKY	6.3	657.2		663.5
LOUISIANA	369.9		259.0	628.9
MAINE				
MARYLAND	1.8	282.1		283.9
MASSACHUSETTS		403.2	868.5	1,271.6
MICHIGAN		675.4	81.9	757.3
MINNESOTA			54.0	54.0
MISSISSIPPI				
MISSOURI				
MONTANA		1,029.4		1,029.4
NEBRASKA		79.7		79.7
NEVADA		65.4		65.4
NEW HAMPSHIRE				
NEW JERSEY		1,566.6		1,566.6
NEW MEXICO	551.9			551.9
NEW YORK		125.2		125.2
NORTH CAROLINA	374.5			374.5
NORTH DAKOTA		791.3		791.3
OHIO		1,924.6		1,924.6
OKLAHOMA				
OREGON		330.2		330.2
PENNSYLVANIA			855.0	855.0
RHODE ISLAND				
SOUTH CAROLINA	406.6			406.6
SOUTH DAKOTA				
TENNESSEE			42.4	42.4
TEXAS				
UTAH				
VERMONT				
VIRGINIA	1,065.3			1,065.3
WASHINGTON		122.2		122.2
WEST VIRGINIA	364.9			364.9
WISCONSIN	.4	109.3		109.7
WYOMING			44.8	44.8
DIST. OF COL.				
PUERTO RICO				
AMERICAN SAMOA				
GUAM				
VIRGIN ISLANDS				
TOTAL	3,703.9	10,874.3	3,110.6	17,688.8

COLUMNS MAY NOT ADD DUE TO ROUNDING.

TABLE C-3c

PAVEMENT MARKING DEMONSTRATION

FEDERAL FUNDS OBLIGATED BY HIGHWAY SYSTEM ($1,000)

AS OF SEPTEMBER 30, 1977

STATE	FEDERAL-AID SYSTEM				STATE DESIGNATED SYSTEM			TOTAL
	PRIMARY	SECONDARY	URBAN	OFF-OR COMBINED	STATE	LOCAL	COMBINED	
ALABAMA	1,081.2	2,224.7	1,178.2	2,239.8	1,680.5	4,825.6	23.8	6,729.9
ALASKA		271.8			271.8			271.8
ARIZONA		318.5		951.2		169.3	1,100.3	1,269.6
ARKANSAS	509.8	1,848.8			2,358.6			2,358.6
CALIFORNIA	12.8	2,812.4	2,992.7	4,826.1	38.4	10,605.6		13,643.6
COLORADO				2,223.5		2,223.5		2,223.5
CONNECTICUT				1,468.2	280.5	1,187.7		1,468.2
DELAWARE		384.2		171.1	555.3			555.3
FLORIDA	190.5	65.2	105.0	6,107.7	369.8		6,098.5	6,468.4
GEORGIA		1,933.2		4,674.5		6,607.7		6,607.7
HAWAII				211.1	123.8	87.3		211.1
IDAHO	297.6	117.2	17.8	981.6	945.1		469.1	1,414.1
ILLINOIS	940.0	1,047.3	174.4	2,583.8	2,124.4	1,243.7	1,377.3	4,745.5
INDIANA	933.7	1,452.4	144.4	3,040.3	2,653.2	2,712.5	205.3	5,570.9
IOWA	648.5	1,977.0	16.2	1,269.3	648.5	3,262.6		3,911.0
KANSAS	115.6	1,447.9	43.7	1,587.8	159.5	2,532.9	502.8	3,194.9
KENTUCKY				3,471.8		878.4	2,593.4	3,471.8
LOUISIANA	917.8	2,299.2	321.3	490.7	3,675.5		353.5	4,029.0
MAINE				2,289.3			2,289.3	2,289.3
MARYLAND	548.7	541.6		530.2	623.4	997.1		1,620.5
MASSACHUSETTS				1,717.0			1,717.0	1,717.0
MICHIGAN		4,668.8		1,894.5		6,563.3		6,563.3
MINNESOTA				4,751.0			4,751.0	4,751.0
MISSISSIPPI		3,210.3			3,210.3			3,210.3
MISSOURI	2,645.6		1/267.8	1,866.6	4,259.2	1,020.8	500.1	5,780.0
MONTANA	22.0		67.0	1,301.9	89.0		1,301.9	1,390.9
NEBRASKA	10.5	837.5		917.0	18.5	1,746.6		1,765.1
NEVADA	317.5	181.2	144.2	188.2	643.4	188.2		831.6
NEW HAMPSHIRE	66.1	282.0	2.0	240.7	444.0	145.7	3.0	592.8
NEW JERSEY	1.0	165.3	8.0	920.9		957.9	137.3	1,095.2
NEW MEXICO	564.6	216.2	20.0	193.6	904.5	89.9		994.3
NEW YORK	230.7	2,108.7	1,285.8	4,185.7	226.3	4,964.9	2,619.7	7,810.8
NORTH CAROLINA				5,062.6	599.6		4,463.0	5,062.6
NORTH DAKOTA	425.8	350.4		278.9	425.8	350.4	278.9	1,055.0
OHIO	1,990.2	8,495.2	141.7	507.3	10,129.3	1,005.1		11,134.4
OKLAHOMA	186.4	1,157.9	102.4	882.1	216.7	2,110.2		2,326.8
OREGON	27.9	989.1	247.3	1,407.4	49.3	2,598.2	24.3	2,671.8
PENNSYLVANIA		175.0		9,093.8	352.8	1,738.6	7,177.3	9,268.8
RHODE ISLAND	31.7	31.7		278.0	341.4			341.4
SOUTH CAROLINA	589.9			4,512.2	4,801.0		301.1	5,102.1
SOUTH DAKOTA	411.5	1,519.1	20.0	14.1	438.1	1,516.6	10.0	1,964.7
TENNESSEE	2,034.3	213.1		2,959.0	2,209.2	128.7	2,868.5	5,206.4
TEXAS	1,392.7	831.1	29.0	8,825.8	8,896.0	2,147.6	35.0	11,078.6
UTAH	8.0	38.9		515.4	46.9	515.4		562.3
VERMONT		85.6		435.2		520.8		520.8
VIRGINIA	1,164.2	2,932.7		97.7	4,192.8		1.8	4,194.6
WASHINGTON	87.4	657.6	719.4	1,033.9	489.1	1,949.4	49.7	2,498.2
WEST VIRGINIA	1,154.8	546.9		279.8	1,793.5		190.0	1,983.5
WISCONSIN	3,617.5	1,192.2	32.3	2,951.1	4,449.3	3,292.5	51.3	7,793.1
WYOMING	146.7	418.2		497.7	574.9	485.7	2.0	1,062.6
DIST. OF COL.		105.1	44.9		44.9	105.1		150.0
PUERTO RICO		50.9		318.1			369.0	369.0
AMERICAN SAMOA								
GUAM								
VIRGIN ISLANDS								
TOTAL	23,329.4	50,203.9	9,125.5	97,245.3	66,163.5	71,475.4	42,265.1	179,904.1

COLUMNS MAY NOT ADD DUE TO ROUNDING.

TABLE C-3d

HIGH-HAZARD LOCATION

FEDERAL FUNDS OBLIGATED BY HIGHWAY SYSTEM ($1,000)

AS OF SEPTEMBER 30, 1977

STATE	FEDERAL-AID-SYSTEM				STATE DESIGNATED SYSTEM			TOTAL
	PRIMARY	SECONDARY	URBAN	COMBINED	STATE	LOCAL	COMBINED	
ALABAMA	2,678.6	804.0			2,889.0	593.6		3,482.6
ALASKA	1,274.9	1,064.7			2,339.6			2,339.6
ARIZONA		692.2	963.0	171.9	1,468.3	187.7	171.9	1,827.9
ARKANSAS	2,068.6	835.2			2,903.8			2,903.8
CALIFORNIA	11,595.7	4,618.1	1,390.3	419.2	17,047.7	556.4	419.2	18,023.3
COLORADO	1,950.7	366.7	164.3		2,326.3	155.3		2,481.6
CONNECTICUT	1,603.3	288.7	191.9	18.9	1,702.6	400.1		2,102.8
DELAWARE	291.6	416.0		253.4	840.0		121.0	961.1
FLORIDA	3,230.1	1,632.3	1,110.8		5,973.1			5,973.1
GEORGIA	3,066.2	1,240.1	76.0	37.5	4,285.1	84.7	48.0	4,417.9
HAWAII	1,236.5	28.0			1,264.5			1,264.5
IDAHO	977.9	111.0	139.8		1,212.0	16.8		1,228.7
ILLINOIS	8,731.5	32.3	537.8	114.6	9,269.3	32.3	114.6	9,416.2
INDIANA	2,326.2	530.9	934.1		3,722.9	68.2		3,791.1
IOWA	3,270.1			55.8	3,270.1	55.8		3,325.9
KANSAS	2,068.3	609.6	190.5	76.9	2,258.8	686.4		2,945.3
KENTUCKY	1,574.3	189.4	1,194.3		2,958.0			2,958.0
LOUISIANA	3,216.5	26.6			3,243.2			3,243.2
MAINE	98.1	870.0		5.9	968.1		5.9	973.9
MARYLAND	2,879.4	140.9			3,020.3			3,020.3
MASSACHUSETTS	2,915.0	1,012.4	65.8	356.4	3,924.7	361.8	63.1	4,349.6
MICHIGAN	3,053.1	1,393.8	3,222.6	7.2	3,741.4	3,935.3		7,676.7
MINNESOTA	4,032.9	118.7	109.1		4,260.7			4,260.7
MISSISSIPPI	836.7	129.7	29.1		865.8	129.7		995.5
MISSOURI	2,909.4	154.9	1,705.2		4,769.5			4,769.5
MONTANA	1,317.2	14.3			1,331.5			1,331.5
NEBRASKA	1,882.5	268.1		22.8	2,026.7	145.7		2,173.4
NEVADA	819.8	136.7	14.0		960.0	10.5		970.5
NEW HAMPSHIRE	15.8	689.8	268.2		920.8	52.9		973.8
NEW JERSEY	3,680.2	107.0	498.8		4,140.9	145.0		4,285.9
NEW MEXICO	470.9	861.4			1,126.2	206.0		1,332.3
NEW YORK	6,930.3	1,711.6	4,919.1	519.2	12,888.2	577.6	614.4	14,080.3
NORTH CAROLINA	2,635.8	532.6	323.9	1,191.8	4,185.2		498.9	4,684.1
NORTH DAKOTA	897.6	645.9			897.6	645.9		1,543.5
OHIO	2,143.8	1,029.5	411.3	128.3	3,481.7	103.0	128.3	3,712.9
OKLAHOMA	818.7	333.9	1,811.1	23.3	1,722.2	1,264.7		2,987.0
OREGON	1,083.0	632.1	890.8	.8	1,938.2	668.5		2,606.7
PENNSYLVANIA	6,890.9	2,806.3	16.8		9,714.0			9,714.0
RHODE ISLAND	688.3	76.1	209.3		973.8			973.8
SOUTH CAROLINA	1,333.9	1,042.8	73.7	143.4	2,593.9			2,593.9
SOUTH DAKOTA	1,054.2	235.6		10.8	1,155.7	134.1	10.8	1,300.5
TENNESSEE	701.8	94.5	88.8	1,029.4	885.1		1,029.4	1,914.5
TEXAS	4,820.6	1,834.9	1,994.7	2,441.5	10,580.0	437.9	73.9	11,091.7
UTAH		992.6	335.4		1,327.9			1,327.9
VERMONT	780.5	193.3			973.8			973.8
VIRGINIA	2,555.8	1,492.6			4,048.4			4,048.4
WASHINGTON	1,276.8	754.9	1,156.8	214.3	1,662.0	1,719.5	21.5	3,402.9
WEST VIRGINIA	822.9	117.9	696.4	31.5	1,637.3		31.5	1,668.8
WISCONSIN	2,853.1	1,238.2	353.4		4,304.0	137.6		4,441.6
WYOMING	945.4	28.4			973.8			973.8
DIST. OF COL.	796.1		12.2	4.7	813.0			813.0
PUERTO RICO	1,747.9		1,082.5	131.9	2,830.4		131.9	2,962.2
AMERICAN SAMOA								
GUAM								
VIRGIN ISLANDS								
TOTAL	117,849.5	35,174.1	27,180.4	7,411.4	170,616.9	13,514.2	3,484.2	187,615.3

COLUMNS MAY NOT ADD DUE TO ROUNDING.

TABLE C-3e

ELIMINATION OF ROADSIDE OBSTACLES

FEDERAL FUNDS OBLIGATED BY HIGHWAY SYSTEM ($1,000)

AS OF SEPTEMBER 30, 1977

STATE	FEDERAL-AID-SYSTEM				STATE DESIGNATED SYSTEM			TOTAL
	PRIMARY	SECONDARY	URBAN	COMBINED	STATE	LOCAL	COMBINED	
ALABAMA	2,693.6	359.5			2,697.8	355.3		3,053.1
ALASKA	317.6	13.9		10.8	331.5		10.8	342.3
ARIZONA	1,483.4			131.9	1,483.4		131.9	1,615.2
ARKANSAS	1,412.0				1,412.0			1,412.0
CALIFORNIA	7,328.1	354.8	1,118.9	9.0	8,470.7	340.1		8,810.8
COLORADO	1,749.9	311.9		16.7	1,972.4	106.0		2,078.4
CONNECTICUT	2,764.9		1.8		2,766.7			2,766.7
DELAWARE	362.8	335.4		44.5	520.7	197.4	24.6	742.7
FLORIDA	3,789.5	818.5	589.4		5,197.4			5,197.4
GEORGIA	3,930.3				3,920.4	9.9		3,930.3
HAWAII	1,035.9				1,035.9			1,035.9
IDAHO	841.4			208.4	841.4		208.4	1,049.8
ILLINOIS	6,467.5	1,710.4		42.3	6,467.5	1,723.9	28.8	8,220.1
INDIANA	3,276.4	687.6	103.5		3,930.9	109.6	27.0	4,067.4
IOWA	2,630.5	183.5	26.9		2,840.8			2,840.8
KANSAS	2,838.9				2,838.9			2,838.9
KENTUCKY	2,231.4	403.9		36.0	2,671.3			2,671.3
LOUISIANA	1,326.6	1,079.8		432.2	2,838.6			2,838.6
MAINE	434.7			5.4	434.7		5.4	440.1
MARYLAND	2,135.3	508.2		37.8	2,643.5		37.8	2,681.3
MASSACHUSETTS	1,162.9	443.4		2,204.0	1,636.3		2,204.0	3,910.3
MICHIGAN	4,734.2	1,088.9	481.6	87.8	4,457.1	1,935.5		6,392.6
MINNESOTA	2,967.0	709.7		53.7	3,374.8	304.4	51.3	3,730.5
MISSISSIPPI	1,414.7				1,406.1		8.6	1,414.7
MISSOURI	3,802.2	254.6	73.1		4,124.1	5.8		4,129.9
MONTANA	1,041.7	54.5	34.0	15.8	1,130.2		15.8	1,146.0
NEBRASKA	722.8	244.3	815.4	129.0	1,782.6	102.8	26.3	1,911.6
NEVADA	542.9	231.3		78.3	852.5			852.5
NEW HAMPSHIRE	604.5	5.4		242.6	609.9		242.6	852.5
NEW JERSEY	1,788.0	1,946.3	671.8	99.4	1,942.5	2,465.3	97.8	4,505.5
NEW MEXICO	561.6	639.9			1,201.4			1,201.4
NEW YORK	7,290.8	996.5	359.0	3,320.1	10,674.6	258.4	1,033.4	11,966.4
NORTH CAROLINA	3,650.2	99.2		330.8	3,928.4		151.8	4,080.2
NORTH DAKOTA	910.5	398.3			910.5	398.3		1,308.8
OHIO	4,481.3	3,013.6	57.0		7,551.8			7,551.8
OKLAHOMA	1,249.7	192.4			1,442.2			1,442.2
OREGON	1,600.5	499.7	14.0		2,018.4	95.7		2,114.1
PENNSYLVANIA	6,475.2	1,403.4	86.2	27.5	7,964.9		27.5	7,992.4
RHODE ISLAND	426.7		401.6		828.3			828.3
SOUTH CAROLINA	1,662.0	474.3		134.6	2,267.7		3.2	2,270.9
SOUTH DAKOTA	650.6	7.7	3.6	18.0	661.9		18.0	679.9
TENNESSEE	3,116.3	49.5		63.0	3,116.3	49.5	63.0	3,228.8
TEXAS	4,487.5	481.6	430.7	992.2	6,392.0			6,392.0
UTAH	246.9	895.1		20.7	1,141.9		20.7	1,162.7
VERMONT	289.3	457.2		87.8	746.5		87.8	834.2
VIRGINIA	2,210.8	1,300.0		33.6	3,544.4			3,544.4
WASHINGTON	2,455.6	231.6	206.9	87.7	2,623.3	313.5	45.0	2,981.7
WEST VIRGINIA	1,042.4	351.3			1,393.7			1,393.7
WISCONSIN	3,172.0	370.7	16.7		3,335.5	223.8		3,559.4
WYOMING	607.8	220.2			828.0			828.0
DIST. OF COL.	772.7		13.5		786.2			786.2
PUERTO RICO	821.8			57.4	581.2		298.0	879.2
AMERICAN SAMOA								
GUAM								
VIRGIN ISLANDS								
TOTAL	116,013.8	23,827.8	5,505.7	9,059.0	140,541.6	8,995.3	4,869.3	154,406.2

COLUMNS MAY NOT ADD DUE TO ROUNDING.

TABLE C-3f

HIGH HAZARD/ELIMINATION OF ROADSIDE OBSTACLES

FEDERAL FUNDS OBLIGATED BY HIGHWAY SYSTEM ($1,000)

AS OF SEPTEMBER 30, 1977

STATE	FEDERAL-AID-SYSTEM				STATE DESIGNATED SYSTEM			TOTAL
	PRIMARY	SECONDARY	URBAN	COMBINED	STATE	LOCAL	COMBINED	
ALABAMA	762.0	189.0	743.4		1,369.0	125.4		1,694.4
ALASKA	102.5	214.5		81.8	317.0		81.8	398.8
ARIZONA			151.5	940.5	572.5	151.5	368.0	1,092.0
ARKANSAS	1,156.9		263.0		1,419.9			1,419.9
CALIFORNIA	5,874.2	149.1	1,168.0		6,680.1	511.2		7,191.3
COLORADO	1,125.8	371.6	30.5		1,518.6	9.4		1,528.0
CONNECTICUT	716.9	135.1	326.9	180.0	903.0	275.9	180.0	1,358.9
DELAWARE	280.6	22.7	25.2		328.5			328.5
FLORIDA	2,383.6	417.4	793.1		3,594.1			3,594.1
GEORGIA	356.9	41.6			307.4	91.1		398.5
HAWAII	75.8				75.8			75.8
IDAHO	422.8	59.3	150.3	8.3	640.7			640.7
ILLINOIS	4,080.0	1,034.7	403.3	307.5	4,371.2	1,262.4	191.9	5,825.5
INDIANA	602.8	876.2	47.3		1,401.6	124.7		1,526.2
IOWA	2,108.9				2,108.9			2,108.9
KANSAS	157.5				157.5			157.5
KENTUCKY								
LOUISIANA	1,366.4	332.7	43.0	241.4	1,676.7		306.8	1,983.5
MAINE	581.0	24.4			605.4			605.4
MARYLAND	1,565.3	338.9			1,904.2			1,904.2
MASSACHUSETTS	1,220.8	497.8	313.1	586.1	1,807.1	378.5	432.2	2,617.8
MICHIGAN	1,230.8	448.2	1,100.7	108.5	1,589.5	1,298.7		2,888.2
MINNESOTA	2,323.7	150.6		153.8	2,270.7	203.6	153.8	2,628.1
MISSISSIPPI								
MISSOURI	1,078.5	52.1	677.7		1,808.3			1,808.3
MONTANA	818.7		34.6		853.2			853.2
NEBRASKA	484.5	165.5	5.6		514.1	141.5		655.5
NEVADA		676.6	123.0	47.3	846.9			846.9
NEW HAMPSHIRE	313.9	186.8			318.7	182.0		500.7
NEW JERSEY								
NEW MEXICO	324.4	398.5			632.4	90.5		722.9
NEW YORK	4,853.2	1,081.3	2,419.5	396.4	8,367.4	5.6	377.4	8,750.4
NORTH CAROLINA	352.4			955.4	1,236.0		71.8	1,307.8
NORTH DAKOTA	561.9	452.5			561.9	452.5		1,014.4
OHIO								
OKLAHOMA								
OREGON	607.3	151.2	190.9	43.4	843.6	149.2		992.8
PENNSYLVANIA	2,291.8	911.7	535.0	1,564.8	3,738.4		1,564.8	5,303.2
RHODE ISLAND			76.4		76.4			76.4
SOUTH CAROLINA	761.7	686.0	93.8	67.5	1,632.3	6.8		1,609.0
SOUTH DAKOTA	65.0	.9	287.4		353.2			353.2
TENNESSEE	1,458.7	72.9			1,531.6			1,531.6
TEXAS	188.7	785.6	655.2	141.9	1,363.8	407.7		1,771.5
UTAH	335.5	351.6			687.1			687.1
VERMONT	41.3				41.3			41.3
VIRGINIA	1,646.8	845.6		18.0	2,510.4			2,510.4
WASHINGTON	322.3	106.2	75.5	11.4	416.8	98.6		515.4
WEST VIRGINIA		446.9	464.8		911.6			911.6
WISCONSIN	527.8	19.8	386.8	36.0	589.1	381.4		970.4
WYOMING	610.9				610.9			610.9
DIST. OF COL.								
PUERTO RICO			106.6		106.6			106.6
AMERICAN SAMOA								
GUAM								
VIRGIN ISLANDS				30.3			30.3	30.3
TOTAL	46,140.4	12,695.4	11,692.0	5,920.3	66,341.2	6,348.1	3,758.7	76,448.0

COLUMNS MAY NOT ADD DUE TO ROUNDING.

TABLE C-3g

SAFER ROADS DEMONSTRATION

FEDERAL FUNDS OBLIGATED BY HIGHWAY SYSTEM ($1,000)

AS OF SEPTEMBER 30, 1977

STATE	STATE DESIGNATED SYSTEM			TOTAL
	STATE	LOCAL	COMBINED	
ALABAMA	5.5	3,628.1	422.9	4,056.6
ALASKA	345.2		61.7	407.0
ARIZONA	180.3	1,400.8	283.5	1,864.6
ARKANSAS	302.7	1,465.1	413.7	2,181.5
CALIFORNIA	152.3	14,260.8	295.2	14,708.2
COLORADO		2,940.2		2,940.2
CONNECTICUT	9.3	1,716.1	349.6	2,075.0
DELAWARE	180.3	806.1	241.5	1,228.0
FLORIDA	795.6	3,807.9	2,575.8	7,179.2
GEORGIA	3.6	5,595.4		5,599.0
HAWAII		571.7		571.7
IDAHO	180.8	141.0	1,079.1	1,400.9
ILLINOIS	17.8		10,225.1	10,242.9
INDIANA	448.9	4,702.7	118.1	5,269.7
IOWA	11.8	4,169.0		4,180.8
KANSAS		2,330.0	160.1	2,490.1
KENTUCKY	117.2	51.6	3,482.5	3,651.3
LOUISIANA	3,776.1		245.4	4,021.5
MAINE	205.5		883.7	1,089.2
MARYLAND	281.4	2,840.2	41.8	3,163.4
MASSACHUSETTS		330.6	5,003.1	5,333.7
MICHIGAN	50.0	8,461.2	767.5	9,278.7
MINNESOTA	3,418.6	933.2	8.4	4,360.2
MISSISSIPPI		146.8	2,379.1	2,525.9
MISSOURI		2,646.9	2,631.6	5,278.5
MONTANA		422.8	1,287.4	1,710.3
NEBRASKA		2,292.6	75.4	2,368.0
NEVADA	15.6	1,006.9		1,022.5
NEW HAMPSHIRE	1,014.4	213.6		1,228.0
NEW JERSEY	13.5	4,218.0	259.2	4,490.7
NEW MEXICO	458.7	1,156.0		1,614.7
NEW YORK	543.0	13,282.3	2,218.4	16,043.7
NORTH CAROLINA	3,238.5	2,027.8	543.5	5,809.9
NORTH DAKOTA		950.0	961.2	1,911.2
OHIO	56.7	10,941.3		10,998.0
OKLAHOMA	37.3	1,643.4	71.2	1,752.0
OREGON	64.6	3,077.3		3,141.9
PENNSYLVANIA	202.0	5,759.1	4,734.6	10,695.6
RHODE ISLAND	565.3			565.3
SOUTH CAROLINA	2,968.7	125.2	123.4	3,217.3
SOUTH DAKOTA	50.0	733.1	732.4	1,515.5
TENNESSEE	39.6	3,030.9	143.8	3,214.4
TEXAS	2,477.0	5,952.0	397.0	8,826.0
UTAH	1,543.0	97.1		1,640.0
VERMONT	24.0	975.1		999.1
VIRGINIA	3,910.7		41.8	3,952.5
WASHINGTON		3,143.5	23.9	3,167.4
WEST VIRGINIA	414.7	621.9	7.7	1,044.3
WISCONSIN		5,485.1		5,485.1
WYOMING	471.8	126.6	381.1	979.6
DIST. OF COL.		1,101.0		1,101.0
PUERTO RICO	1,547.1		72.2	1,619.3
AMERICAN SAMOA				
GUAM	310.1		76.4	386.5
VIRGIN ISLANDS			1,228.0	1,228.0
TOTAL	30,449.2	131,328.2	45,048.1	206,825.5

COLUMNS MAY NOT ADD DUE TO ROUNDING.

TABLE C-3h

SAFER OFF-SYSTEM ROADS

FEDERAL FUNDS OBLIGATED BY HIGHWAY SYSTEM ($1,000)

AS OF SEPTEMBER 30, 1977

STATE	STATE DESIGNATED SYSTEM			TOTAL
	STATE	LOCAL	COMBINED	
ALABAMA				
ALASKA				
ARIZONA				
ARKANSAS	1,202.6	205.6	48.5	1,456.7
CALIFORNIA		-		
COLORADO		112.0		112.0
CONNECTICUT				
DELAWARE	149.7			149.7
FLORIDA	505.3			505.3
GEORGIA				
HAWAII				
IDAHO			321.2	321.2
ILLINOIS				
INDIANA				
IOWA				
KANSAS				
KENTUCKY				
LOUISIANA				
MAINE	78.1			78.1
MARYLAND		119.4		119.4
MASSACHUSETTS				
MICHIGAN		2,295.7		2,295.7
MINNESOTA				
MISSISSIPPI			52.2	52.2
MISSOURI				
MONTANA				
NEBRASKA				
NEVADA		217.8		217.8
NEW HAMPSHIRE				
NEW JERSEY				
NEW MEXICO				
NEW YORK				
NORTH CAROLINA				
NORTH DAKOTA		834.9	90.4	925.3
OHIO		366.5		366.5
OKLAHOMA				
OREGON				
PENNSYLVANIA				
RHODE ISLAND				
SOUTH CAROLINA				
SOUTH DAKOTA		228.6		228.6
TENNESSEE				
TEXAS				
UTAH		1,230.8		1,230.8
VERMONT				
VIRGINIA	543.8		697.1	1,240.8
WASHINGTON				
WEST VIRGINIA				
WISCONSIN				
WYOMING				
DIST. OF COL.				
PUERTO RICO				
AMERICAN SAMOA				
GUAM				
VIRGIN ISLANDS				
TOTAL	2,479.5	5,611.2	1,209.4	9,300.1

COLUMNS MAY NOT ADD DUE TO ROUNDING.

TABLE C-3i

OFF SYSTEM ROADS* (safety projects only)

FEDERAL FUNDS OBLIGATED BY HIGHWAY SYSTEM ($1,000)

AS OF SEPTEMBER 30, 1977

STATE	STATE DESIGNATED SYSTEM			TOTAL
	STATE	LOCAL	COMBINED	
ALABAMA		18.2		18.2
ALASKA				
ARIZONA		105.5	136.4	241.9
ARKANSAS	284.1	16.7	31.9	332.7
CALIFORNIA		1,779.1		1,779.1
COLORADO		2,874.8		2,874.8
CONNECTICUT		323.7		323.7
DELAWARE	21.0			21.0
FLORIDA	63.6			63.6
GEORGIA		382.5		382.5
HAWAII		139.9		139.9
IDAHO		160.1	1,545.4	1,705.5
ILLINOIS		295.8		295.8
INDIANA		351.2		351.2
IOWA		2,790.0	43.4	2,833.4
KANSAS		2,107.5		2,107.5
KENTUCKY				
LOUISIANA	514.1		624.5	1,138.6
MAINE				
MARYLAND	76.8	292.1		368.9
MASSACHUSETTS	4.2	203.5		207.7
MICHIGAN		1,476.1		1,476.1
MINNESOTA	37.2	3,398.0		3,435.2
MISSISSIPPI				
MISSOURI		25.2		25.2
MONTANA		155.8	387.0	542.8
NEBRASKA				
NEVADA				
NEW HAMPSHIRE	93.2			93.2
NEW JERSEY		298.8	283.3	582.1
NEW MEXICO	821.6	35.0		856.6
NEW YORK		4,308.5	489.1	4,797.6
NORTH CAROLINA	1,062.3		195.0	1,257.2
NORTH DAKOTA		963.0	244.2	1,207.3
OHIO		61.1		61.1
OKLAHOMA	31.5	433.2		464.7
OREGON		271.5		271.5
PENNSYLVANIA		1,568.6	376.4	1,945.0
RHODE ISLAND				
SOUTH CAROLINA	368.3		285.0	653.3
SOUTH DAKOTA		79.0	411.0	490.1
TENNESSEE	105.7	847.1	337.1	1,289.8
TEXAS	232.7	564.9		797.6
UTAH		1,614.1		1,614.1
VERMONT	9.8	96.2		106.1
VIRGINIA	86.8			86.8
WASHINGTON		282.8	165.5	448.2
WEST VIRGINIA	339.1		18.2	357.3
WISCONSIN	259.2	1,453.9	74.2	1,787.3
WYOMING			187.8	187.8
DIST. OF COL.				
PUERTO RICO	71.8			71.8
AMERICAN SAMOA				
GUAM				
VIRGIN ISLANDS				
TOTAL	4,483.1	29,773.3	5,835.4	40,091.8

COLUMNS MAY NOT ADD DUE TO ROUNDING.

*Total obligations for off-system roads program = $159,812,139

TABLE C-4

TRANSFER/RELEASE OF SAFETY FUNDS

STATE	AMOUNT($)	FROM	TO	TYPE OF ACTION
		FY 1977		
Alaska	265,095	Pavement Marking Program	Hazard Reduction Program	Release
Arizona	600,000	Rail-Highway Crossing Program	Bridge Replacement Program	Transfer
Dist. of Col.	270,728	Rail-Highway Crossing Program	Elimination of Roadside Obstacles	Transfer
Hawaii	116,134	Rail-Highway Crossing Program	Elimination of High Hazards Prog.	Transfer
Nebraska	700,088	Pavement Marking Program	Hazard Reduction Program	Release
Nevada	301,000	Bridge Replacement Program	High Hazard/Roadside Obstacle	Transfer
New Mexico	750,000	Rail-Highway Crossing Program	High Hazard/Roadside Obstacle	Transfer
North Dakota	226,872	Rail-Highway Crossing Program	High Hazard/Roadside Obstacle	Transfer
Puerto Rico	2,061,539	Rail-Highway Crossing Program	High Hazard/Roadside Obstacle	Transfer
South Carolina	868,000	Pavement Marking Program	Hazard Reduction Program	Release
Vermont	125,138	Pavement Marking Program	Hazard Reduction Program	Release
			PRIOR TO FY 1977	
Alaska	1,395,168	Rail-Highway Crossing Program	Elimination of High Hazard Prog.	Transfer
Puerto Rico	425,884	Rail-Highway Crossing Program	Elimination of Roadside Obstacle	Transfer
Connecticut	745,273	Rail-Highway Crossing Program	Elimination of Roadside Obstacle	Transfer
Connecticut	254,727	Elimination of High Hazard Prog.	Elimination of Roadside Obstacle	Transfer
Hawaii	232,300	Rail-Highway Crossing Program	Elimination of Roadside Obstacle	Transfer

These changes are reflected in the TOTAL APPORTIONMENT column of Tables C-1a and C-1c through C-1f.

TABLE C-5

SAFETY CONSTRUCTION PROGRAM OBLIGATIONS

As of September 30, 1977

PROGRAM	FY 1974	FY 1975	FY 1976	TQ	FY 1977	TOTAL
Rail-Highway On-System	4,811,213	31,483,478	46,140,100	13,870,847	81,226,153	177,531,791
Rail-Highway Off-System	-	-	-	-	17,688,814	17,688,814
Pavement Marking Demonstration	4,161,857	49,865,675	58,966,521	9,469,375	57,440,672	179,904,100
High Hazard Location	9,692,167	64,331,312	67,391,201	14,599,669	31,600,989	187,615,338
Elimination of Roadside Obstacles	3,561,730	50,310,972	53,214,277	13,953,628	33,365,606	154,406,213
High Hazard/Elimination of Roadside Obstacles	-	-	653,756	11,578,661	64,185,276	76,417,693
Safer Roads Demonstration	4,546,903	46,305,279	70,417,401	26,845,726	58,710,189	206,825,498
Safer Off-System (Safety Projects)*	-	-	-	-	4,371,959	4,371,959
TOTALS	26,773,870	242,296,716	296,783,256	90,317,906	348,589,658	1,004,761,406

*Total Safer Off-System obligation was $9,300,109.

Figures may not agree with obligation amounts included in previous reports; differences are due to subsequent obligation amendments.

APPENDIX D

PAVEMENT MARKING STATUS BY STATE

TABLE D-1

PAVEMENT MARKING DEMONSTRATION PROGRAM
Mileage Marked and Cost in $1,000

STATE	FISCAL YEAR 1977												Cumulative Totals To Date	
	FEDERAL-AID SYSTEM						OFF FEDERAL-AID SYSTEM				FY 1977 Total			
	Urban		Primary		Secondary		State		Local					
	Miles	Cost	Miles	Cost	Miles	Cost	Miles	Cost	Miles	Cost	Miles	Cost	Miles Marked	Cost
ALABAMA	*	*	*	*	*	*	*	*	*	*	*	*	*	*
ALASKA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARIZONA	*	*	*	*	*	*	*	*	*	*	*	*	*	*
ARKANSAS	*	*	*	*	*	*	*	*	*	*	*	*	*	*
CALIFORNIA	233	217	0	0	730	415	65	50	1,752	814	2,780	1,496	7,372	2,505
COLORADO	-	-	-	-	-	-	439	271	81	89	520	360	2,346	1,301
CONNECTICUT	-	-	3,800	283	-	-	-	-	3,042	363	6,842	646	9,849	1,050
DELAWARE 1/	*	*	179	22	334	89	0	0	0	0	513	111	1,416	431
FLORIDA	*	*	*	*	*	*	*	*	*	*	*	*	*	*
GEORGIA	-	-	-	-	1,252	460	-	-	1,222	440	2,474	900	16,992	5,930
HAWAII	0	0	68	52	23	17	0	0	44	33	135	102	213	148
IDAHO 1/	0	0	2,096	340	0	0	0	0	0	0	2,096	340	3,726	1,360
ILLINOIS	2	6	71	293	38	104	-	-	137	383	248	786	1,208	3,097
INDIANA	0	0	0	0	2,450	615	0	0	1,180	295	3,630	910	4,958	1,840
IOWA	49	43	957	223	3,024	2,107	0	0	0	0	4,030	2,373	5,966	2,813
KANSAS	6	111	-	-	1,294	321	-	-	144	36	1,444	468	4,403	1,557
KENTUCKY	41	191	241	739	9	15	-	-	-	-	291	945	996	1,322
LOUISIANA 1/	*	*	356	224	1,176	426	902	534	134	114	2,568	1,298	6,842	3,082
MAINE 1/	-	-	1,170	311	1,220	325	188	41	-	-	2,578	677	5,089	1,336
MARYLAND	4	1	-	-	961	143	-	-	693	104	1,658	248	1,996	408
MASSACHUSETTS	-	-	44	11	564	130	-	-	727	153	1,335	294	3,400	952
MICHIGAN 1/	0	0	-	-	13,456	921	-	-	5,299	360	18,755	1,281	34,823	3,955
MINNESOTA	60	28	-	-	9,395	3,583	-	-	1,438	455	10,893	4,066	10,893	4,066
MISSISSIPPI	-	-	-	-	497	275	-	-	163	91	660	366	1,805	1,232
MISSOURI	31	399	623	230	*	*	*	*	194	115	848	744	2,238	1,219
MONTANA	-	-	670	40	1,622	83	-	-	410	28	2,702	151	3,850	286
NEBRASKA	0	0	0	0	0	0	0	0	0	0	0	0	3,037	707
NEVADA	*	*	*	*	*	*	*	*	*	*	*	*	*	*
NEW HAMPSHIRE 1/	-	-	49	8	951	133	258	36	58	8	1,316	185	1,316	185
NEW JERSEY	*	*	*	*	*	*	*	*	*	*	*	*	*	*
NEW MEXICO	-	-	259	95	9	4	-	-	-	-	268	99	2,103	496
NEW YORK	-	-	-	-	439	1,903	-	-	481	1,756	920	3,659	5,332	4,740
NORTH CAROLINA 1/	-	-	-	-	5,731	634	2,455	271	-	-	8,186	905	17,583	2,613
NORTH DAKOTA	6	5	1,622	217	-	-	-	-	-	-	1,628	222	3,710	684
OHIO	*	*	*	*	*	*	*	*	*	*	*	*	*	*
OKLAHOMA	*	*	*	*	*	*	*	*	*	*	138	21	8,563	1,771
OREGON	100	11	-	-	2,000	164	-	-	2,500	215	4,600	390	9,600	813
PENNSYLVANIA	-	-	-	-	-	-	-	-	6,300	1,359	6,300	1,359	17,855	6,109
RHODE ISLAND	-	-	111	17	121	18	102	15	23	3	357	53	522	108
SOUTH CAROLINA	62	298	169	818	20	108	12	52	0	0	263	1,276	6,079	3,370
SOUTH DAKOTA	-	-	134	15	1,412	346	15	2	360	92	1,921	455	6,474	1,405
TENNESSEE	-	-	1,917	798	-	-	-	-	-	-	1,917	798	11,109	3,516
TEXAS	23	38	1,772	3,118	673	1,101	163	183	502	359	3,133	4,799	4,723	5,450
UTAH	-	-	267	50	493	110	10	2	-	-	770	162	1,658	366
VERMONT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VIRGINIA	-	-	274	39	1,203	200	273	54	4	1	1,754	294	4,130	677
WASHINGTON	53	13	-	-	282	52	-	-	119	19	454	84	454	84
WEST VIRGINIA 1/	-	-	292	53	972	158	84	13	-	-	1,348	224	3,889	677
WISCONSIN	5	4	4	1	1,705	405	-	-	2,993	382	4,707	792	10,486	3,232
WYOMING	*	*	*	*	*	*	*	*	*	*	*	*	*	*
DIST. OF COL.	*	*	*	*	*	*	*	*	*	*	*	*	*	*
PUERTO RICO	0	0	0	0	0	0	0	0	0	0	0	0	270	196
TOTAL 2/	675	1,365	17,145	7,997	54,056	15,365	4,966	1,524	30,000	8,067	106,980	34,339	249,274	77,089

FOOTNOTES

* - Not Reported

1/ - Reporting Period Other Than 7/1/76 to 6/30/77. (See attached sheet).

2/ - Totals do not add across as Oklahoma did not report mileage and cost by systems.

43 States Reported.

Footnotes for TABLE D-1

State		Reporting Period
Delaware	-	During FY 1977
Idaho	-	1/1/76 to 1/1/77
Louisiana	-	During FY 1977
Maine	-	7/1/75 to 6/30/76
Michigan	-	During FY 1977
New Hampshire	-	7/1/75 to 6/30/77
North Carolina	-	6/1/76 to 10/1/77
West Virginia	-	8/16/76 to 8/15/77

TABLE D-2

PAVEMENT MARKINGS DEMONSTRATION PROGRAM
MILES TO BE MARKED

STATE	FEDERAL-AID SYSTEM				OFF FEDERAL-AID SYSTEM			Grand Total
	Urban	Primary	Secondary	Total	State	Local	Total	
ALABAMA	*	*	*	*	*	*	*	*
ALASKA	*	*	*	*	*	*	*	*
ARIZONA	*	*	*	*	*	*	*	*
ARKANSAS	*	*	*	*	*	*	*	*
CALIFORNIA	923	0	651	1,574	0	1,726	1,726	3,300
COLORADO	-	-	-	-	691	0	691	691
CONNECTICUT	-	-	-	-	-	2,587	2,587	2,587
DELAWARE	0	0	0	0	0	0	0	0
FLORIDA	*	*	*	*	*	*	*	*
GEORGIA	2,500	5,000	4,000	11,500	-	5,000	5,000	16,500
HAWAII	4	44	55	103	0	33	33	136
IDAHO	0	0	4,025	4,025	0	9,000	9,000	13,025
ILLINOIS	165	-	817	982	-	-	-	982
INDIANA	292	2,095	7,152	9,539	0	3,820	3,820	13,359
IOWA	Unk	0	0	0	0	0	0	0
KANSAS	-	0	3,797	3,797	0	368	368	4,165
KENTUCKY	-	-	-	-	-	-	-	-
LOUISIANA	*	*	*	*	*	*	*	*
MAINE	-	1,166	1,155	2,321	86	-	86	2,407
MARYLAND	15	23	308	346	-	1,021	1,021	1,367
MASSACHUSETTS	360	188	943	1,491	-	1,488	1,488	2,979
MICHIGAN	-	-	1,234	1,234	-	3,614	3,614	4,848
MINNESOTA	-	-	150	150	-	30	30	180
MISSISSIPPI	700	-	5,202	5,902	-	11,837	11,837	17,739
MISSOURI	187	158	*	*	*	271	*	Unk
MONTANA	-	-	272	272	-	207	207	479
NEBRASKA	47	-	-	47	21	-	21	68
NEVADA	*	*	*	*	*	*	*	*
NEW HAMPSHIRE	-	-	-	-	27	113	140	140
NEW JERSEY	*	*	*	*	*	*	*	*
NEW MEXICO	-	551	504	1,055	-	246	246	1,301
NEW YORK	172	-	-	172	-	1,128	1,128	1,300
NORTH CAROLINA	-	-	2,340	2,340	1,003	-	1,003	3,343
NORTH DAKOTA	-	1,165	1,352	2,517	-	-	-	2,517
OHIO	*	*	*	*	*	*	*	*
OKLAHOMA	*	*	*	*	*	*	*	33
OREGON	-	-	1,000	1,000	-	400	400	1,400
PENNSYLVANIA	-	-	550	550	1,050	15,450	16,500	17,050
RHODE ISLAND	*	*	*	*	*	*	*	*
SOUTH CAROLINA	0	0	0	0	0	0	0	0
SOUTH DAKOTA	-	255	237	492	9	100	109	601
TENNESSEE	-	1,855	-	1,855	-	-	-	1,855
TEXAS	152	1,822	710	2,684	484	3,217	3,701	6,385
UTAH	-	0	-	0	0	-	0	0
VERMONT	0	0	549	549	0	551	551	1,100
VIRGINIA	35	361	8,001	8,397	4,011	-	4,011	12,408
WASHINGTON	264	62	1,384	1,710	-	1,827	1,827	3,537
WEST VIRGINIA	-	229	3,190	3,419	375	-	375	3,794
WISCONSIN	108	2,146	1,474	3,728	17	3,090	3,107	6,835
WYOMING	*	*	*	*	*	*	*	*
DIST. OF COL.	*	*	*	*	*	*	*	*
PUERTO RICO	-	30	40	70	7	0	7	77
TOTAL 1/	5,924	17,150	51,092	73,821	7,781	67,124	74,634	148,488

FOOTNOTES

* - Not Reported

Unk - Unknown

1/ - Totals do not add across as Missouri and Oklahoma did not report mileage by systems.

43 States Reported.

[illegible]

[illegible]

[illegible]

[illegible]

THE PRESIDENT OF THE UNITED STATES

[illegible]

[illegible]

[illegible]

U.S. GOVERNMENT PRINTING OFFICE

WASHINGTON : [illegible]

TABLE D-2

[illegible] MARKINGS DEMONSTRATION PROGRAM
MILES TO BE MARKED

STATE	FEDERAL-AID SYSTEM				OFF FEDERAL-AID SYSTEM			Grand Total
	[illegible]	[illegible]	Secondary	Total	[illegible]	[illegible]	Total	
TOTAL 1/	5,934	17,150	91,082	73,841	[illegible]	[illegible]	78,834	148,488

FOOTNOTES:

* - Not Reported
Unk - Unknown
1/ - Totals do not add across as Missouri and Oklahoma did not report mileage by systems.
43 States Reported.

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95th Congress, 2d Session - - - - - - - - - - - - - - - - House Document No. 95-310

BUDGET OF THE DISTRICT OF COLUMBIA
FISCAL YEAR 1979

MESSAGE

FROM

THE PRESIDENT OF THE UNITED STATES

TRANSMITTING

THE BUDGET OF THE DISTRICT OF COLUMBIA FOR FISCAL YEAR 1979,
PURSUANT TO SECTION 446 OF PUBLIC LAW 93-198

APRIL 3, 1978.—Message and accompanying papers referred to the Committee on Appropriations and ordered to be printed

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1978

25-810 O

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TO THE CONGRESS OF THE UNITED STATES:

In accordance with the District of Columbia Self-Government and Governmental Reorganization Act, I am transmitting for your consideration the budget of the District of Columbia for fiscal year 1979.

Jimmy Carter

THE WHITE HOUSE,

March 27, 1978.

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REVENUES

REVENUES (Thousands)	1977 Actual	1978 Estimate	1979 Estimate
General Revenues:			
Property taxes:			
Realty	$ 152,620	$ 169,570	$ 207,600
Personal tangible	14,685	24,525	17,870
Subtotal, property taxes	167,305	194,095	225,470
Sales and gross receipts:			
Alcoholic beverages	10,682	10,330	10,020
Cigarette	12,523	11,780	11,190
Insurance	18,031	11,630	12,440
Motor vehicle excise	11,953	11,450	11,450
Public utilities, banks, etc.	43,257	78,000	56,350
Sales and use	141,129	144,490	152,990
Subtotal, sales and gross receipts	237,575	267,680	254,440
Income taxes:			
Individual income	200,928	201,423	214,781
Corporation franchise	40,160	38,300	39,250
Unincorporated business franchise	17,919	16,700	17,150
Subtotal, income taxes	259,007	256,423	271,181
Other taxes:			
Inheritance and estate	19,872	8,000	8,000
Real estate recordation tax	7,446	7,030	7,390
Motor vehicle registration fees	8,831	7,170	7,170
Subtotal, other taxes	36,149	22,200	22,560
Total, tax revenues	700,036	740,398	773,651
Charges and Miscellaneous:			
Licenses and other	7,796	7,730	7,820
Charges for current services	12,582	20,690	20,610
Fines and forfeitures	14,723	14,470	14,610
Policemen and firemen's retirement	14,675	15,980	16,760
Other miscellaneous revenue	4,635	3,800	3,800
Total, charges and miscellaneous	54,411	62,670	63,600
Total, revenues from taxes and charges	754,447	803,068	837,251
Federal payment	276,650	300,000[1]	317,000
Federal loan—public works	98,240	105,847	120,500
Federal loan—rail transit	1,760	8,353	—
Federal advances—stadium	832	832	832
Revenue sharing	32,240[2]	36,543	[2] 28,818
Total, general revenues	1,164,169	1,254,643	1,304,401

Revenues—continued	1977 Actual	1978 Estimate	1979 Estimate
Transportation Revenues:			
Gasoline tax	22,795	22,780	22,780
Licenses and other income	16,025	12,600	12,710
Motor vehicle parking account	2,992	3,670	3,790
Subtotal	41,812	39,050	39,280
Water Revenues:			
Water service charges	16,511	19,665	17,110
Payments from Arlington County and Falls Church, Virginia	2,559	2,560	2,560
Other charges and revenue	439	350	350
Subtotal	19,509	22,575	20,020
Federal payment for water consumed	1,499	15,321	[3] 5,300
Total, water revenues	21,008	37,896	25,320
Sanitary Sewage Works Revenues:			
Sewer service charges	16,811	22,360	19,460
Payment from Maryland and Virginia	5,578	6,400	7,360
Payment from users of Potomac Interceptor	2,562	3,500	4,700
Other charges and revenue	340	200	200
Subtotal	25,291	32,460	31,720
Federal payment for sewer services	1,208	12,795	[3] 5,000
Total, sanitary sewage works revenues	26,499	45,255	36,720
Metropolitan Area Sanitary Sewage Works Revenues:			
Potomac Interceptor sewerline—Sewer charges	480	820	1,200
Grand Total (exclusive of miscellaneous and special funds)	1,253,968	1,377,464	1,406,921
Other municipal revenue:			
Grants and non-D.C. reimbursements	430,460	489,189	407,303
Grand Total, all revenues	1,684,428	1,866,653	1,814,224

[1] *Authorized pursuant to Public Law 93-198.*
[2] *Includes anti-recession funds.*
[3] *Authorized pursuant to Public Law 95-122.*

BUDGET AUTHORITY

Budget Authority (Thousands)	1977 Actual	1978 Estimate	1979 Estimate	Change from 1978
Operating Funds				
General Operating Expenses:				
D. C. funds	$ 85,823.3	$ 93,450.3	$ 96,326.8	+$2,876.5
Federal grants	134,484.4	157,530.5	119,337.0	-38,193.5
Other grants and non-D.C. reimbursements	14,447.3	17,060.0	11,630.4	-5,429.6
Subtotal	234,755.0	268,040.8	227,294.2	-40,746.6
Public Safety:				
D. C. funds	266,882.7	273,121.5	274,412.8[1]	+1,291.3
Federal grants	444.2	383.8	9.2	-374.6
Other grants and non-D.C. reimbursements	3,573.2	3,742.7	3,657.0	-85.7
Subtotal	270,900.1	277,248.0	278,079.0	+831.0
Education:				
D. C. funds	264,466.2	275,225.5	282,898.6	+7,673.1
Federal grants	51,476.7	49,191.1	48,714.8	-476.3
Other grants and non-D.C. reimbursements	1,164.4	1,037.5	970.1	-67.4
Subtotal	317,107.3	325,454.1	332,583.5	+7,129.4
Recreation:				
D. C. funds	18,241.2	18,561.2	18,677.4	+116.2
Federal grants	2,504.4	1,947.4	2,576.4	+629.0
Other grants and non-D.C. reimbursements	6.5	6.5	6.5	—
Subtotal	20,752.1	20,515.1	21,260.3	+745.2
Human Resources:				
D. C. funds	272,163.2	291,396.9	294,474.8	+3,077.9
Federal grants	102,733.7	101,118.4	94,343.2	-6,775.2
Other grants and non-D.C. reimbursements	64,798.8	67,952.7	88,047.1	+20,094.4
Subtotal	439,695.7	460,468.0	476,865.1	+16,397.1
Transportation:				
D. C. funds	56,618.4	62,141.5	77,551.7	+15,410.2
Federal grants	1,168.6	1,647.4	1,121.2	-526.2
Other grants and non-D.C. reimbursements	1,259.6	1,597.2	1,873.0	+275.8
Subtotal	59,046.6	65,386.1	80,545.9	+15,159.8

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[1] *Council Recommendation, pursuant to Public Law 93-198. The Joint Committee on Judicial Administration has requested $28,174.4 for the Court of Appeals, Superior Court, and the Court System.*

Budget Authority—continued	1977 Actual	1978 Estimate	1979 Estimate	Change from 1978
Operating Funds—continued				
Environmental Services:				
D. C. funds	67,193.5	71,269.1	73,309.9	+2,040.8
Federal grants	1,612.1	1,415.3	1,322.4	−92.9
Other grants and non-D.C. reimbursements	3,130.2	2,756.4	2,507.4	−249.0
Subtotal	71,935.8	75,440.8	77,139.7	+1,698.9
Other Operating:				
Personal Services	—	34,949.7	69,300.0	+34,350.3
Settlement of Claims and Suits	234.1	—	—	—
Repayment of Loans and Interest	80,838.7	116,968.5	111,700.0	−5,268.5
Inaugural Expenses	650.0	—	—	—
Subtotal	81,722.8	151,918.2	181,000.0	+29,081.8
Operating Funds:				
D. C. funds	1,113,111.3	1,237,084.2	1,298,652.0	+61,567.8
Federal grants	294,424.1	313,233.9	267,424.2	−45,809.7
Other grants and non-D.C. reimbursements	88,380.0	94,153.0	108,691.5	+14,538.5
TOTAL, OPERATING FUNDS	1,495,915.4	1,644,471.1	1,674,767.7	+30,296.6
CAPITAL FUNDS:				
D. C. funds	36,586.7	177,476.9	129,790.0	−47,686.9
Federal grants and non-D.C. reimbursements	47,655.9	81,802.3	31,187.0	−50,615.3
TOTAL, CAPITAL FUNDS	84,242.6	259,279.2	160,977.0	−98,302.2
Total funds distributed as follows:				
D. C. funds	1,149,698.0	1,414,561.1	1,428,442.0	+13,880.9
Federal grants and other grants and non-D.C. reimbursements	430,460.0	489,189.2	407,302.7	−81,886.5
TOTAL	1,580,158.0	1,903,750.3	1,835,744.7	−68,005.6

OUTLAYS

Outlays (Thousands)	1977 Actual	1978 Estimate	1979 Estimate	Change from 1978
Operating Expenses:				
General Operating Expenses:				
District of Columbia funds	$ 87,858.8	$ 93,450.3	$ 96,326.8	+$2,876.5
Grants and reimbursements	117,478.8	174,590.5	130,967.4	−43,623.1
Subtotal	205,337.6	268,040.8	227,294.2	−40,746.6
Public Safety:				
District of Columbia funds	265,872.9	273,121.5	274,412.8	+1,291.3
Grants and reimbursements	4,002.0	4,126.5	3,666.2	−460.3
Subtotal	269,874.9	277,248.0	278,079.0	+831.0
Education:				
District of Columbia funds	270,197.2	275,225.5	282,898.6	+7,673.1
Grants and reimbursements	50,937.4	50,228.6	49,684.9	−543.7
Subtotal	321,134.6	325,454.1	332.583.5	+7,129.4
Recreation:				
District of Columbia funds	18,263.6	18,561.2	18,677.4	+116.2
Grants and reimbursements	1,392.0	1,953.9	2,582.9	+629.0
Subtotal	19,655.6	20,515.1	21,260.3	+745.2
Human Resources:				
District of Columbia funds	271,370.2	291,396.9	294,474.8	+3,077.9
Grants and reimbursements	159,291.9	169,071.1	182,390.3	+13,319.2
Subtotal	430,662.1	460,468.0	476,865.1	+16,397.1
Transportation:				
District of Columbia funds	56,708.5	62,141.5	77,551.7	+15,410.2
Grants and reimbursements	2,421.7	3,244.6	2,994.2	−250.4
Subtotal	59,130.2	65,386.1	80,545.9	+15,159.8
Environmental Services:				
District of Columbia funds	67,093.7	71,269.1	73,309.9	+2,040.8
Grants and reimbursements	2,560.2	4,171.7	3,829.8	−341.9
Subtotal	69,653.9	75,440.8	77,139.7	+1,698.9

Outlays—continued	1977 Actual	1978 Estimate	1979 Estimate	Change from 1978
OPERATING EXPENSES—continued				
Other Operating:				
Personal Services	—	34,949.7	69,300.0	+34,350.3
Settlement of Claims and Suits and Judgments	1,303.6	—	—	—
Repayment of Loans and Interest	80,838.6	116,968.5	111,700.0	−5,268.5
Inaugural Expenses	650.0	—	—	—
Bicentennial Expenses	71.6	—	—	—
Refunds	4,803.2	—	—	—
Purchase and installation of parking meters	7.0	—	—	—
Subtotal	87,674.0	151,918.2	181,000.0	+29,081.8
Miscellaneous Municipal Funds (permanent):				
Advisory Neighborhood Commissions, Security Fund	−1.0	−1.1	−1.2	−.1
Publication Fund	−2.6	−2.6	−2.6	—
Working Capital, Educational Agency for Surplus Property	−3.1	−3.4	−3.8	−.4
Repairs and Improvements, Working Fund	−3.071.4	4,164.0	−646.8	−4,810.8
Printing and Reproduction, Working Fund	12.2	−.1	−15.0	−14.9
Construction Services	969.4	−7,300.0	−1,900.0	+5,400.0
Correctional Industries Fund	50.0	22.0	−59.0	−81.0
Public Schools Food Service Fund	700.1	1,000.0	600.0	−400.0
Alcoholic Rehabilitation Program	19.3	−23.5	—	+23.5
Maintenance and Repairs of Vehicles, Working Fund	56.0	144.8	—	−144.8
Operating Fund, R.F. Kennedy Memorial Stadium	−274.0	50.0	100.0	+50.0
Working Capital Fund, Armory Board	37.8	−15.0	−15.0	—
Subtotal	−1,507.3	−1,964.9	−1,943.4	+21.5
Special Trust Fund Deposits:				
Property Redemption Fund	−28.5	−2.0	—	+2.0
Surplus Funds, Realty Tax Sales	−62.0	−10.0	—	+10.0
Security Brokers Fund	57.0	14.6	—	−14.6
Welfare Funds, Department of Corrections	−28.3	−29.7	−31.2	−1.5
Inmates Fund, Department of Corrections	1.6	−.9	−3.0	−2.1
Fees and Other Collections, Recreation Department	28.9	30.0	20.0	−10.0
Student Loan Program	−388.8	205.1	−431.4	−636.5

Outlays—continued	1977 Actual	1978 Estimate	1979 Estimate	Change from 1978
Special Trust Fund Deposits—continued				
Motor Vehicle Financial Responsibility Fund	81.2	98.0	50.0	−48.0
Operating Accounts Streets	−295.7	72.9	—	−72.9
Judicial Retirement and Survivor's Annuity Fund	−61.0	−189.0	−189.0	—
Teachers' Retirement and Annuity Fund	−1,395.0	−2,020.0	—	+2,020.0
Subtotal	−2,090.6	−1,831.0	−584.6	+1,246.4
Total, Operating Expenses	1,459.525.0	1,640,675.2	1,672,239.7	+31,564.5
Operating Funds are distributed as follows:				
District of Columbia funds	1,125,038.9	1,237,084.2	1,298,652.0	+61,567.8
Grants and reimbursements	338,084.0	407,386.9	376,115.7	−31,271.2
Miscellaneous and special funds	−3,597.9	−3,795.9	−2,528.0	+1,267.9
Capital Funds:				
District of Columbia funds	99,332.0	114,200.0	120,500.0	+6,300.0
Grants and reimbursements	69,441.5	81,802.3	31,187.0	−50,615.3
Total, Capital Funds	168,773.5	196,002.3	151,687.0	−44,315.3
Grand Total	1,628,298.5	1,836,677.5	1,823,926.7	−12,750.8
Recapitulation of Totals:				
District of Columbia funds for operating expenses, contingencies, loan repayments, miscellaneous and special funds	1,121,441.0	1,233,288.3	1,296,124.0	+62,835.7
District of Columbia funds for capital outlay	99,332.0	114,200.0	120,500.0	+6,300.0
Grants and reimbursements	407,525.5	489,189.2	407,302.7	−81,886.5

FINANCING

Financing (Thousands)	1977 Actual	1978 Estimate	1979 Estimate
PART A—Financing Operating Programs and Loan Repayments from District of Columbia funds:			
Surplus, start of year	$23,550	$4,108	$4,755
Revenue sharing	32,240	36,543	28,818
Revenues	1,120,896	1,225,889	1,276,771
Short-term loans	20,000	20,000	40,000
Total Availability	1,196,686	1,286,540	1,350,344
Requirements	1,192,578	1,281,785	1,346,052
Surplus, end of year	4,108	4,755	4,292
PART B—Financing Capital Outlay Program from District of Columbia funds:			
Surplus, start of year	2,132	2,800	2,800
Loan proceeds	100,000	114,200	120,500
Total Availability	102,132	117,000	123,300
Requirements	99,332	114,200	120,500
Surplus, end of year	2,800	2,800	2,800
PART C—Financing Grants, Reimbursements, Miscellaneous and Special Funds:			
Surplus, start of year	105,522	119,299	123,095
Grants and reimbursements	417,704	489,189	407,303
Total Availability	523,226	608,488	530,398
Funds required:			
Grants and reimbursements	407,525	489,189	407,303
Miscellaneous municipal funds	−1,507	−1,965	−1,943
Special trust funds	−2,091	−1,831	−585
Total funds required (outlays)	403,927	485,393	404,775
Surplus, end of year	119,299	123,095	125,623

Financing—continued	1977 Actual	1978 Estimate	1979 Estimate
PART D—Summary of Total Financing Funds Available:			
Operating programs, D. C. funds	1,196,686	1,286,540	1,350,344
Capital outlay, D. C. funds	102,132	117,000	123,300
Grants, reimbursements, miscellaneous and special funds	523,226	608,488	530,398
Total Availability	1,822,044	2,012,028	2,004,042
Funds Required:			
Operating programs, D. C. funds	1,192,578	1,281,785	1,346,052
Capital outlay, D. C. funds	99,332	114,200	120,500
Grants, reimbursements, miscellaneous and special funds	403,927	485,393	404,775
Total funds required	1,695,837	1,881,378	1,871,327
Surplus, end of year	126,207	130,650	132,715

APPROPRIATION LANGUAGE

Division of Expenses

The following amounts are appropriated for the District of Columbia for the current fiscal year out of the general fund of the District of Columbia, except as otherwise specifically provided:

General Operating Expenses

General operating expenses, $96,326,800, of which $799,300 shall be payable from the revenue sharing trust fund: Provided, That not to exceed $2,500 for the Mayor and $2,500 for the Chairman of the Council of the District of Columbia and $300 for each of the other twelve members of the Council of the District of Columbia shall be available from this appropriation for expenditures for official purposes: Provided further, That, for the purpose of assessing and reassessing real property in the District of Columbia, $5,000 of this appropriation shall be available for services as authorized by 5 U.S.C. 3109, but at rates for individuals not in excess of $100 per diem: Provided further, That not to exceed $7,500 of this appropriation shall be available for test borings and soil investigations: Provided further, That $5,857,900 of this appropriation (to remain available until expended) shall be available solely for District of Columbia employees' disability compensation: Provided further, That not to exceed $325,000 of this appropriation shall be available for settlement of property damage claims not in excess of $1,500 each and personal injury claims not in excess of $5,000 each: Provided further, That not to exceed $50,000 of any appropriations available to the District of Columbia may be used to match financial contributions from the Department of Defense to the District of Columbia Office of Emergency Preparedness for the purchase of civil defense equipment and supplies approved by the Department of Defense, when authorized by the Mayor: Provided further, That $3,000,000 of this appropriation (to remain available until expended) shall be for the District of Columbia's contribution toward the expenses of the Temporary Commission on Financial Oversight of the District of Columbia, as authorized by Public Law 94-399, September 4, 1976.

Public Safety

Public safety, including purchase of one hundred and thirty-two passenger motor vehicles for replacement only (including one hundred and thirty for police-type use and two for fire-type use without regard to the general purchase price limitation for the current fiscal year); $274,412,800, of which $5,863,400 shall be payable from the revenue sharing trust fund: Provided, That the Police Department is authorized to replace not to exceed twenty-five passenger carrying vehicles, and the Fire Department not to exceed five such vehicles annually whenever the cost of repair to any damaged vehicle exceeds three-fourths the cost of the replacement: Provided further, That funds appropriated for expenses under the Criminal Justice Act of 1974 (P.L. 93-412) for Fiscal Year 1979 shall be available for obligations incurred under that Act in any fiscal year beginning after June 30, 1974: Provided further, That not to exceed $200,000 shall be available from this appropriation for the Chief of Police for the prevention and detection of crime.

Education

Education, including the development of national defense education programs, $282,898,600 of which $7,664,800 shall be payable from the revenue sharing trust fund, to be allocated as follows: $217,338,600 for the District of Columbia Public Schools, $21,705,000 for the Teachers' Retirement Fund, and $43,855,000 for the University of the District of Columbia: Provided, That the District of Columbia Public Schools are authorized to accept not to exceed thirty-one motor vehicles for exclusive use in the driver education program: Provided further, That not to exceed $1,000 for the Superintendent of Schools and $2,000 for the President of the University of the District of Columbia shall be available from this appropriation for expenditures for official purposes: Provided further, That the $21,705,000 of this appropriation allocated for the Teachers' Retirement Fund shall be transferred to the Teachers' Retirement Fund, in accordance with the provisions of section 7 of the Act of August 7, 1946 (60 Stat. 879, as amended; D.C. Code, sec. 31-727).

Recreation

Recreation, $18,677,400, of which $208,200 shall be payable from the revenue sharing trust fund.

Human Resources

Human resources, including care and treatment of indigent patients in institutions under contracts to be made by the Director of the Department of Human Resources, $294,474,800, of which $6,520,000 shall be payable from the revenue sharing trust fund: Provided, That the inpatient rate under such contracts shall not exceed $76 per *diem and the outpatient rate shall not exceed $12 per visit, and the inpatient rate (excluding the proportionate share for repairs and construction) for services rendered by Saint Elizabeths Hospital for patient care shall be at the per diem rate established pursuant to 24 U.S.C. 168a: Provided further, That total reimbursements to Saint Elizabeths Hospital, including funds from title XIX of the Social Security Act, shall not exceed $20,919,500: Provided further, That the hospital rates specified herein shall not apply, beginning July 1, 1969, to services provided to patients who are eligible for such services under the District of Columbia plan for medical assistance under title XIX of the Social Security Act: Provided further, That this appropriation shall be available for the furnishing of medical assistance to individuals sixty-five years of age or older who are residing in the District of Columbia: Provided further, That $15,642,200 of this appropriation shall be available for care and treatment of the mentally retarded at Forest Haven.*

Transportation

Transportation, including rental of one passenger-carrying vehicle for use by the Mayor of the District of Columbia and purchase of two passenger-carrying vehicles which shall be for replacement only, $77,551,700, of which $6,262,300 shall be payable from the revenue sharing trust fund: Provided, That this appropriation shall not be available for the purchase of driver-training vehicles: Provided further, That $1,263,400 of this appropriation shall be available for the fiscal year 1977 metrobus operating subsidy.

Environmental Services

Environmental services, $73,309,900, of which $1,500,000 shall be payable from the revenue sharing trust fund: Provided, That this appropriation shall not be available for collecting ashes or miscellaneous refuse from hotels and places of business or from apartment houses with four or more apartments, or from any building or connected group of buildings operating as a rooming or boarding house as defined in the housing regulations of the District of Columbia.

Personal Services

For pay increases and related costs, to be transferred by the Mayor of the District of Columbia to the appropriations for the fiscal year 1979 from which employees are properly payable, $69,300,000.

Repayment of Loans and Interest

For reimbursement to the United States of funds loaned in compliance with sections 108, 217, and 402 of the Act of May 18, 1954 (68 Stat. 103, 109, and 110), as amended; section 9 of the Act of September 7, 1957 (71 Stat. 619), as amended; section 1 of the Act of June 6, 1958 (72 Stat. 183), as amended; section 4 of the Act of June 12, 1960 (74 Stat. 211), as amended; and section 723 of the District of Columbia Self-Government and Governmental Reorganization Act (Public Law 93-198), as amended, including interest as required thereby, $111,700,000.

Capital Outlay

For reimbursement to the United States of funds loaned in compliance with the Act of August 7, 1946 (60 Stat. 896), as amended, construction projects as authorized by the Acts of April 22, 1904 (33 Stat. 244), May 18, 1954 (68 Stat. 105, 110), July 2, 1954 (68 Stat. 443), June 6, 1958 (72 Stat. 183), August 20, 1958 (72 Stat. 686), and the Act of December 9, 1969 (83 Stat. 321); including acquisition of sites; preparation of plans and specifications; conducting preliminary surveys; erection of structures, including building improvement and alteration and treatment of grounds; to remain available until expended, $129,790,000: Provided, That $4,380,400 shall be available for construction services by the Director of the Department of General Services or by contract for architectural engineering services, as may be determined by the Mayor, and the funds for the use of the Director of the Department of General Services shall be advanced to the appropriation account "Construction Services, Department of General Services": Provided further, That the amount appropriated to the Construction Services Fund, Department of General Services, be limited, during the current fiscal year, to ten per centum of appropriations for all construction projects, except for Project Numbered 24-99, Permanent Improvements, for which construction services shall be limited to twenty per centum of the appropriation: Provided further, Notwithstanding the foregoing, all authorizations for capital outlay projects, except those projects covered by the first sentence of section 23(a) of the Federal-Aid Highway Act of 1968 (Public Law 90-495, approved August 23, 1968), for which funds are provided by this paragraph, shall expire on September 30, 1980, except authorizations for projects as to which funds have been obligated in whole or in part prior to such date. Upon expiration of any such project authorization the funds provided herein for such project shall lapse.

General Provisions

Sec. 101. *Except as otherwise provided in this title, all vouchers covering expenditures of appropriations contained in this title shall be audited before payment by the designated certifying official and the vouchers as approved shall be paid by checks issued by the designated disbursing official.*

Sec. 102. *Whenever in this title an amount is specified within an appropriation for particular purposes or object of expenditure, such amount, unless otherwise specified, shall be considered as the maximum amount which may be expended for said purpose or object rather than an amount set apart exclusively therefor.*

Sec. 103. *Appropriations in this title shall be available, when authorized or approved by the Mayor, for allowances for privately-owned conveyances used for the performance of official duties at 13 cents per mile but not to exceed $45 a month for each automobile and at 8 cents per mile but not to exceed $30 a month for each motorcycle, unless otherwise therein specifically provided, except that one hundred and thirteen (eighteen for venereal disease investigators in the Department of Human Resources) such automobile allowances at not more than $715 each per annum may be authorized or approved by the Mayor.*

Sec. 104. *Appropriations in this title shall be available for expenses of travel and for the payment of dues of organizations concerned with the work of the District of Columbia government, when authorized by the Mayor.*

Sec. 105. *Appropriations in this title shall not be used for or in connection with the preparation, issuance, publication, or enforcement of any regulation or order of the Public Service Commission requiring the installation of meters in taxicabs, or for or in connection with the licensing of any vehicle to be operated as a taxicab except for operation in accordance with such system of uniform zones and rates and regulations applicable thereto as shall have been prescribed by the Public Service Commission.*

Sec. 106. *Appropriations in this title shall not be available for the payment of rates for electric current for street lighting in excess of 2 cents per kilowatt-hour for current consumed.*

Sec. 107. *There are hereby appropriated from the applicable funds of the District of Columbia such sums as may be necessary for making refunds and for the payment of judgments which have been entered against the government of the District of Columbia: Provided, That nothing contained in this section shall be construed as modifying or affecting the provisions of paragraph 3, subsection (c) of section 11 of title XII of the District of Columbia Income and Franchise Tax Act of 1947, as amended.*

Sec. 108. *Appropriations in this title shall be available for the payment of public assistance without reference to the requirement of subsection (b) of section 5 of the District of Columbia Public Assistance Act of 1962 and for the non-Federal share of funds necessary to equalify for Federal assistance under the Act of July 31, 1968 (Public Law 90-445).*

Sec. 109. *No part of any appropriation contained in this title shall remain available for obligation beyond the current fiscal year unless expressly so provided herein.*

Sec. 110. *No part of any funds appropriated by this title shall be used to pay the compensation (whether by contract or otherwise) of any individual for performing services as a chauffeur or driver for any designated officer or employee of the District of Columbia government (other than the Mayor of the District of Columbia, Chief of Police and Fire Chief), or for performing services as a chauffeur or driver of a motor vehicle assigned for the personal or individual use of any such officer or employee (other than the Mayor of the District of Columbia, Chief of Police and Fire Chief). No part of any funds appropriated by this title, in excess of $1,000 per month in the aggregate ($12,000 per annum) shall be used to pay the compensation (whether by contract or otherwise) of individuals for performing services as a chauffeur or driver for the Mayor of the District of Columbia, or for performing services as a chauffeur or driver of a motor vehicle assigned for the personal or individual use of the Mayor of the District of Columbia.*

Sec. 111. *Not to exceed 4-1/2 per centum of the total of all funds appropriated by this title for personal compensation may be used to pay the cost of overtime or temporary positions.*

Sec. 112. *The total expenditure of funds appropriated by this title for authorized travel and per diem costs outside the District of Columbia, Maryland, and Virginia shall not exceed $225,000.*

Sec. 113. Appropriations in this title shall not be available, during the fiscal year ending September 30, 1979, for the compensation of any person appointed—

(1) as full-time employee to a permanent, authorized position in the government of the District of Columbia during any month when the number of such employees is greater than 33,741: Provided, That:

(A) 9,704 positions within this city employment limitation shall be set aside as the maximum number of permanent, authorized employees of the District of Columbia Public Schools;

(B) a limit, not to exceed 2,424 employees, is hereby established for the District of Columbia General Hospital apart and aside from the city-wide limitation on employment in permanent authorized positions, and

(C) the District of Columbia Public Schools and the District of Columbia General Hospital shall not exceed their respective employment limitations and are hereby required to report monthly to the Mayor of the District of Columbia, for the purpose of maintaining controls on city-wide employment, regarding the total number of current employees and the total number of separations and filling of positions within their respective employment limitations; or

(2) as a temporary or part-time employee in the government of the District of Columbia during any month in which the number of such employees exceeds the number of such employees for the same month of the preceding fiscal year.

Sec. 114. No funds appropriated in this title, for the government of the District of Columbia for the operation of educational institutions, the compensation of personnel, or for other educational purposes may be used to permit, encourage, facilitate, or further partisan political activities. Nothing herein is intended to prohibit the availability of school buildings for the use of any community group during non-school hours.

Sec. 115. Appropriations in this title shall be available for services as authorized by 5 U.S.C. 3109, at rates to be fixed by the Mayor.

Sec. 116. There are hereby appropriated from the applicable funds of the District of Columbia such sums as may be necessary for making payments authorized by the District of Columbia Revenue Recovery Act of 1977, D.C. Law 2-20, September 23, 1977.

This Act may be cited as the "District of Columbia Appropriation Act, 1979."

NOTE The annual appropriation for Fiscal Year 1978 for the District of Columbia had not been enacted at the time this budget was prepared. Three House Joint Resolutions have provided continuing budget authority for Fiscal Year 1978: H.J. Res. 626 (P.L. 95-130) for the period October 1 through October 31, 1977; H.J. Res. 643 (P.L. 95-165) for the period November 1 through November 30, 1977; and H.J. Res. 662 (P.L. 95-205) for the period December 1, 1977 through September 30, 1978.

GENERAL OPERATING EXPENSES

General Operating Expenses (Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Operating Expenses:			
Office of the Mayor	$ 1,443.0	$ 1,109.7	$ 1,423.0
D. C. funds	1,170.0	1,058.7	1,372.0
Federal grants	216.8	—	—
Other grants and non-D.C. reimbursements	56.2	51.0	51.0
Council of the District of Columbia	2,330.2	2,624.0	3,017.2
D. C. funds	2,330.2	2,624.0	3,017.2
Auditor of the District of Columbia	224.4	264.1	264.1
D. C. funds	224.4	264.1	264.1
Office of the Secretariat	617.2	600.4	693.9
D. C. funds	617.2	600.4	693.9
Office of Public Affairs	193.0	188.7	218.7
D. C. funds	193.0	188.7	218.7
Office of Budget and Management Systems	19,035.7	11,372.0	10,438.4
D. C. funds	7,257.1	10,785.7	10,038.4
Federal grants	11,362.1	95.3	—
Other grants and non-D.C. reimbursements	416.5	491.0	400.0
Municipal Planning Office	3,475.5	2,398.4	2,229.8
D. C. funds	2,000.8	1,815.5	1,735.6
Federal grants	1,474.7	582.9	494.2
Office of Personnel	1,723.3	1,694.4	1,752.8
D. C. funds	1,653.5	1,604.4	1,662.8
Federal grants	69.8	90.0	90.0
Compensation Funds:			
Disability Compensation	4,764.6	5,861.0	5,857.9
D. C. funds	4,764.6	5,861.0	5,857.9
Unemployment Compensation	5,948.6	6,782.9	5,962.9
D. C. funds	5,948.6	6,782.9	5,962.9
Workmen's Compensation	740.0	751.2	751.2
D. C. funds	740.0	751.2	751.2
Office of Emergency Preparedness	404.1	462.7	393.6
D. C. funds	139.1	147.5	147.5
Federal grants	265.0	315.2	246.1
Office of Human Rights	1,133.9	1,150.1	1,016.3
D. C. funds	1,025.5	1,050.5	916.7
Federal grants	108.4	99.6	99.6
Office of Consumer Protection	326.1	458.6	568.1
D. C. funds	326.1	458.6	568.1

General Operating Expenses—continued (Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Operating Expenses			
Rental Accommodations Office	684.7	751.9	751.9
D. C. funds	684.7	751.9	751.9
Bicentennial Activities	606.0	—	—
D. C. funds	187.1	—	—
Federal grants	418.9	—	—
Department of Finance and Revenue	10,433.2	11,446.9	11,866.0
D. C. funds	10,359.3	11,446.9	11,866.0
Federal grants	73.9	—	—
Office of the Corporation Counsel	4,267.3	3,967.1	4,044.6
D. C. funds	4,137.3	3,914.6	4,044.6
Federal grants	130.0	52.5	—
Department of General Services	18,188.4	17,193.6	17,901.0
D. C. funds	18,188.4	17,193.6	17,901.0
Department of Economic Development	3,124.7	2,965.5	2,962.7
D. C. funds	3,119.8	2,935.5	2,932.7
Federal grants	4.9	30.0	30.0
Public Library	9,152.5	9,213.4	9,305.5
D. C. funds	8,641.8	8,748.7	8,900.8
Federal grants	480.5	459.8	399.8
Other grants and non-D.C. reimbursements	30.2	4.9	4.9
Department of Manpower	32,787.6	54,513.0	54,580.6
D. C. funds	478.2	277.2	344.8
Federal grants	32,309.4	54,235.8	54,235.8
Office of Youth Advocacy	220.4	256.1	245.0
D. C. funds	220.4	256.1	245.0
Department of Housing and Community Development	104,929.3	118,978.8	76,799.2
D. C. funds	4,810.4	5,089.8	6,481.2
Federal grants	86,292.8	97,447.9	59,226.9
Other grants and non-D.C. reimbursements	13,826.1	16,441.1	11,091.1
Board of Parole	541.6	484.3	517.6
D. C. funds	514.7	484.3	479.5
Federal grants	26.9	—	38.1
Department of Insurance	565.1	644.6	641.6
D. C. funds	565.1	644.6	641.6
Minimum Wage and Industrial Safety Board	846.5	965.6	1,145.3
D. C. funds	714.4	764.2	801.9
Federal grants	47.9	169.5	305.6
Other grants and non-D.C. reimbursements	84.2	31.9	37.8

General Operating Expenses—continued (Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Operating Expenses			
Recorder of Deeds	836.0	875.2	875.2
D. C. funds	836.0	875.2	875.2
Public Service Commission	817.7	793.3	822.9
D. C. funds	749.5	713.1	732.2
Federal grants	34.1	40.1	45.1
Other grants and non-D.C. reimbursements	34.1	40.1	45.6
Board of Elections and Ethics	1,012.8	1,881.0	1,905.0
D. C. funds	1,012.8	1,881.0	1,905.0
Office of the Surveyor	387.4	398.5	398.5
D. C. funds	387.4	398.5	398.5
Advisory Neighborhood Commissions	900.0	1,003.4	1,000.0
D. C. funds	900.0	1,003.4	1,000.0
Special Mission Activities:			
Boxing and Wrestling Commission	—	—	40.0
D. C. funds	—	—	40.0
Office of Criminal Justice Plans and Analysis	1,168.3	2,027.6	1,774.1
D. C. funds	—	—	106.3
Federal grants	1,168.3	2,027.6	1,667.8
Office on Aging	—	2,506.7	2,630.5
D. C. funds	—	622.4	646.2
Federal grants	—	1,884.3	1,984.3
Commission on the Arts and Humanities	—	161.0	159.4
D. C. funds	—	161.0	159.4
Office on Latino Affairs	—	109.6	139.8
D. C. funds	—	109.6	139.8
Board of Appeals and Review	79.5	94.5	93.6
D. C. funds	79.5	94.5	93.6
Office of Business and Economic Development	—	—	300.0
Federal grants	—	—	300.0
Commission on the Status of Women	41.0	42.8	54.1
D. C. funds	41.0	42.8	54.1
Commission on Judicial Disabilities and Tenure	55.6	69.0	82.1
D. C. funds	55.6	69.0	82.1
Board of Labor Relations	91.4	111.6	111.6
D. C. funds	91.4	111.6	111.6
Judicial Nomination Commission	24.5	17.5	32.3
D. C. funds	24.5	17.5	32.3

General Operating Expenses—continued Thousands	1977 Actual	1978 Estimate	1979 Estimate
Law Revision Commission	220.9	371.2	390.2
D. C. funds	220.9	371.2	390.2
Educational Institution Licensure Commission	—	—	81.9
D. C. funds	—	—	81.9
Commission on Healing Arts Licensure	—	—	199.3
D. C. funds	—	—	199.3
Manpower Planning Advisory Council	—	—	173.7
Federal grants	—	—	173.7
Board of Equalization and Review	—	—	114.6
D. C. funds	—	—	114.6
Washington Metropolitan Council of Governments	161.0	226.9	239.5
D. C. funds	161.0	226.9	239.5
Washington Area Convention and Visitors Bureau	200.0	200.0	100.0
D. C. funds	200.0	200.0	100.0
Minority Business Opportunity Commission	—	—	175.0
D. C. funds	—	—	175.0
Chamber of Commerce	52.0	52.0	52.0
D. C. funds	52.0	52.0	52.0
TOTAL	234,755.0	268,040.8	227,294.2
D. C. funds	85,823.3	93,450.3	96,326.8
Federal grants	134,484.4	157,530.5	119,337.0
Other grants and non-D.C. reimbursements	14,447.3	17,060.0	11,630.4
Capital Funds			
Municipal Planning Office	—	27,700.0	49,000.0
D. C. funds	—	27,700.0	49,000.0
Department of General Services	7,718.0	44,269.0	5,270.0
D. C. funds	7,718.0	41,805.0	5,270.0
Federal grants	—	2,464.0	—
Public Library	—	1,659.0	—
D. C. funds	—	1,659.0	—
Department of Housing and Community Development	—	13,700.0	—
Federal grants	—	13,700.0	—
Total	7,718.0	87,328.0	54,270.0
D. C. Funds	7,718.0	71,164.0	54,270.0
Federal grants	—	16,164.0	—

The General Operating Expenses Appropriation funds District agencies that carry out a wide range of activities, including top-level policy making, legislation and administration; central staff services such as printing, contract administration and automatic data processing; budgeting and tax administration; library services; housing, community and economic development; and regulatory functions. The budget for Fiscal Year 1979 requests $96,326,800 in operating funds for City departments, agencies and expenditures in this appropriation account.

Office of the Mayor.

The Mayor is the Chief Executive officer of the District of Columbia, with overall responsibility for the organization, management, and policies of the City government. The Mayor also is the official representative of the City before citizens, organizations, other governmental activities and international visitors.

The Fiscal Year 1979 budget request for the Office of the Mayor includes positions and funds necessary to the performance of the Mayor's duties. Included in the request are funds for the development of the Mayor's legislative program, the oversight function in management of City affairs, and the coordination and execution of the Mayor's other responsibilities. The request for appropriated resources is $1,372,000 and 43 positions, which includes three positions and $88,800 transferred in from the Office of Budget and Management Systems. Also included in the request is $92,600 to provide funding for three additional positions and other operating costs for the Legislation Office.

Council of the District of Columbia.

The Council of the District of Columbia, as the legislative branch, has broad legislative powers and responsibilities. The functions of the Council encompass those of a typical city council, county council or board and state legislators. Members of the Council deal with a broader range of issues than other local legislative bodies.

The 1979 Fiscal Year budget of 101 positions and $3,017,200 represents an increase of $393,200 and 15 positions over the Fiscal Year 1978 budget. These increases are required in order to: (1) support the Congressional mandate (Public Law 94-386) that the Council publish the D. C. Code and supplements thereto, estimated at $141,200; (2) provide funds for within grade increases, $41,900; (3) provide funds to supplement salaries of CETA employees; and (4) to provide funds for the operation of 13 constituent services offices, $205,700.

Office of the District of Columbia Auditor.

The Office of the District of Columbia Auditor is responsible for conducting a thorough audit of the City's operations and financial conditions. The Office has been given the additional responsibility of monitoring the City's deposit of funds into local financial institutions.

The Fiscal Year 1979 appropriated budget request for operating the Office of the District of Columbia Auditor is 10 positions and $264,100.

Within this request, funding is provided for overall personnel and inflationary expenses, continued work on the City's use of non-appropriated funds and proposed reorganization plans, and expenses to be incurred in carrying out the new depository responsibilities. Prospective statutory work includes staff review of budget controls on Federal funds.

Office of The Secretariat.

The Office of the Secretariat provides the primary administrative staff support for the Mayor and is engaged in a wide range of staff responsibilities including the performance of ministerial duties for the Mayor.

The Fiscal Year 1979 appropriated budget request for this operating program is 26 positions and $693,900.

Within this request, funding is provided for inflationary expenses and to continue to provide staff support to the Mayor. This Office also provides most of the administrative support work for the Commission on the Arts and Humanities, Office on Aging, the Legislation Office, Advisory Neighborhood Commissions and Office on Latino Affairs.

Funding for new programs and activities includes $78,500 for inflationary and workload items. One position will be transferred into the agency and $15,000 in dues funds is also transferred to reflect the fiscal control for dues in the Office of the Secretariat.

Office of Public Affairs.

The Office of Public Affairs is the central agency of the Executive branch of the District government for news announcements.

The Fiscal Year 1979 appropriated budget request for this operating program is eight positions and $218,700.

Within this request, funding is provided for overall personnel and inflationary expenses to continue the dissemination of information about District government activities, functions and services to the news media and community and the development and coordination of public information activities for other departments and agencies.

Funding for programs and activities includes an increase of $30,000 for the publication of 7,500 *For Your Information* booklets that contain a financial report to the people of the District of Columbia. The booklet also lists all of the City government's available services.

Office of Budget and Management Systems.

The Office of Budget and Management Systems is responsible for District-wide budget formulation and program analysis; central financial management and accounting functions; development of new and improved financial systems; provision of central computer services; management and performance improvements; and enforcement of prescribed policies, regulations, laws and procedures within the City government through a continuing program of audits.

The Fiscal Year 1979 appropriated budget request for operating programs is 281 positions and $10,038,400. This request is $747,300 less than the Fiscal Year 1978 appropriation request of $10,785,700. The following reductions have been made to the Office of Budget and Management Systems budget: (1) $306,000 from the Financial Systems Development Division; (2) $186,600 from the Computer Services Division; (3) $208,700 and 10 positions from the Municipal Audits and Inspection Division; and (4) the complete abolition of the Executive Management Division, amounting to $293,300 and ten positions. (Three of these ten positions and $88,800 have been transferred to the Mayor's Office.) The portion of the one percent citywide reduction applied to Office of Budget and Management Systems amounts to $77,800.

Funding for new programs and activities totals $3,295,300. These increases are $3,000,000, which is the City's share of the cost of the Congressionally established Temporary Commission on Financial Oversight pursuant to Public Law 94-399; $284,700 for assumption of the costs associated with 13 analyst positions previously funded through Federal grants in the Resource Management Improvements Division; and $10,600 to annualize the cost of new positions requested in Fiscal Year 1978 for the Financial Systems Development Division.

Within this request, funding is provided for overall personnel and inflationary expenses and to continue development of financial management improvements throughout the City. Maintenance of improvement efforts in the City's computer services, including the SHARE Computer Center, and in the monitoring of program performance is also included in this request.

Municipal Planning Office.

The Municipal Planning Office is responsible for the development and coordination of planning policies for the District of Columbia. The primary goal of the Office is to create a central municipal planning capability for the District that provides for the fullest participation of citizens in the planning process. The Office is responsible for developing an overall comprehensive plan for the District, providing central statistical information, and planning services and grants management for LEAA block grant funds. The Office also provides administrative support to the Zoning Commission and the Board of Zoning Adjustment.

The Fiscal Year 1979 appropriated budget request for operating programs is 77 positions and $1,735,600. Non-appropriated funds which support operating programs for this office include $494,200 in Federal grants.

Within this request, funding is provided for overall personnel expenses and to maintain essential services at the same level as in Fiscal Year 1978. To complete its tasks, the Municipal Planning Office has developed a program which involves regearing the planning programs within the Municipal Planning Office and stressing effective coordination and participation of various departments and agencies of the government. A redirection of resources to strengthen the planning, zoning and data analyses activities of Municipal Planning Office is the only basic resource available within present austerity constraints. To meet the needs of the planning and zoning functions, it is proposed to redirect to those functions the bulk of resources now assigned to the Community Services Division. In addition, the Fiscal Year 1979 budget request reflects the transfer out of five positions and $107,300 for the Criminal Justice Planning function.

Funding for new programs and activities is not inlcuded in this budget request, however, increases are provided for certain personnel and operating expenses which the office cannot continue to absorb.

Office of Personnel.

The Personnel Office serves in an advisory capacity on personnel matters to the Mayor, the City Council, and the various departments and agencies.

The Fiscal Year 1979 appropriated budget request for this operating program is 72 positions and $1,662,800. Non-appropriated funds which support operating programs for this agency include $90,000 in Federal grants.

Within this request, funding is provided for overall personnel and inflationary expenses and to continue and maintain leadership and direction for personnel management programs throughout the District government through direct and delegated authorities. In this capacity, the Office interprets and issues personnel policies, procedures, and related instructions and amendments as needed or required by law or U. S. Civil Service Commission regulations.

Resources for installation of an Independent Merit system which may occur in Fiscal Year 1979 in accordance with Public Law 93-198 (Home Rule Act) have not been included in the Fiscal Year 1979 request. Additional budget requirements will be determined when detailed provisions of the personnel law are known. If new legislation requires centralization of personnel functions, positions and resources may be redirected within the City government precluding the need for additional resources.

Funding increases in Fiscal Year 1979 include two positions and $38,600 for the position classification program to eliminate work backlogs and to implement changes in classification methods as required by the new U. S. Civil Service Commission Factor Evaluation System. In addition, one position and $19,800 for recruitment and employment activitiy is required to meet employee selection guidelines recently issued by the U. S. Civil Service Commission to eliminate discrimination in hiring practices.

Employees' Disability Compensation.

Employees' Disability Compensation is the City's program for medical care, compensation and, when appropriate, vocational rehabilitation for District employees injured on the job.

The Fiscal Year 1979 appropriated budget request for this program is $5,857,900.

Within this request, funding is provided for inflationary expenses related to costs of medical care of injured employees; compensation for temporary or permanent disability and surviving dependents; burial expenses and vocational rehabilitation.

Public Law 93-198, Home Rule Act, requires, upon adoption of a new personnel system, that the functions now performed by the U. S. Department of Labor in regard to disability compensation be transferred to the District Government. Although initial costs of assuming this program may be significant, substantial savings in excess of these costs should accrue to the City in future years with adequate staff to exercise control functions not now performed by the U. S. Department of Labor.

The Fiscal Year 1979 funding for the program is essentially the same as that for Fiscal Year 1978.

Unemployment Compensation.

The District government unemployment compensation program provides unemployment benefits, as required by law, to eligible former District government employees.

The Fiscal Year 1979 appropriated budget request for this program is $5,962,900. Within this request, funding is provided for required unemployment benefit payments. The funding level for Fiscal Year 1979 incorporates a moderate decline in the number of claimants filing for regular D. C. benefits, the number of payments required and the number of weeks that a claimant receives benefits. Expiration of the National Extended Benefits Program is also considered in this budget mark.

Workmen's Compensation.

The District government reimburses the U. S. Department of Labor for costs incurred in the administration of the workmen's compensation program for private sector employees in the District of Columbia.

The Fiscal Year 1979 appropriated budget request for this program is $751,200.

The Workmen's Compensation program administered by the U. S. Department of Labor for the District of Columbia is an income maintenance program. Funding is provided for inflationary expenses to continue and maintain the program. Its purpose is to ease the burden of income loss due to work-related incidents that permanently or temporarily reduce or negate an employee's wage earning capacity.

The funding level for Fiscal Year 1979 remains unchanged from the previous year. An in-depth U. S. Department of Labor review and analysis of mandatory expenditures and percent fund allocations should provide capacity to continue the program at the Fiscal Year 1978 level and provide limited expansion through reprogrammings of available funds.

Office of Emergency Preparedness.

The Office of Emergency Preparedness has the responsibility to ameliorate and minimize the impact of local emergencies, natural disasters or enemy attack on the people, government, institutions and structures of the District of Columbia.

The Fiscal Year 1979 appropriated budget request for operating programs is $147,500 and seven positions. Non-appropriated funds, which support operating programs for this agency, include $246,100 in Federal grants.

Within this request, funding is provided for overall personnel expenses and to continue services at present levels. Programs receiving priority consideration for Fiscal Year 1979 include improvements to the emergency operational capability to respond to local emergencies, natural disasters, or other national emergency situations involving the local government; and expansion of the community assistance and citizen outreach program to provide assistance to community organizations and citizens in emergency situations. There are no significant program shifts or new programs proposed for Fiscal Year 1979.

Office of Human Rights.

This office is concerned with enforcement of the Human Rights Act (Title 34), monitoring equal employment opportunities provided by vendors who contract with the D. C. Government and monitoring the affirmative action plans of D. C. Government agencies.

The Fiscal Year 1979 appropriated budget request for the operating programs is 49 positions and $916,700. Non-appropriated funds which support operating programs for this agency include $99,600 in Federal grants.

Within this request, funding is provided for overall personnel and inflationary expenses and to continue and maintain a program for the enforcement of the District's Human Rights Law that provides for the investigation, conciliation, or adjudication of complaints of discrimination in employment, housing, public accommodations and educational institutions; a program that ensures agencies of the District Government will adopt and observe affirmative action programs; a program for the voluntary compliance by private sector firms with affirmative action planning; and a program for monitoring compliance by District government contracts with District laws requiring contractors to maintain affirmative action plans.

The Commission on Human Rights, which was established by Commissioner's Order Number 71-224, dated July 8, 1971, is responsible for conducting public hearings in cases where the Office of Human Rights, after a thorough investigation, finds probable cause. The Commission together with the Office of Human Rights may make, issue, adopt, promulgate and rescind necessary rules and procedures. These should not conflict with the provisions of the Human Rights Act. Funding for the Commission's activities is included in the agency's budget request.

Office of Consumer Protection.

The Office of Consumer Protection is responsible for implementation and enforcement of the District's consumer protection laws which include laws and regulations on unfair trade practices, health spas, prescription prices, retail credit, and automobile and electronic repair dealers. In carrying out this responsibility, the agency investigates consumer complaints, initiates its own investigations, provides consumers remedies within its authority, maintains broad consumer education and information programs, and undertakes activities to encourage the business community to maintain high standards of conduct in dealing with consumers. In addition, because of the requirements of the enabling legislation which established the Office of Consumer Protection, the agency also deals with consumer-related Federal laws and regulations, and many other District of Columbia laws.

The Fiscal Year 1979 appropriated budget for operating programs is 21 positions and $568,100. Within this request, funding is provided for overall personnel and inflationary expenses, and for continuance of the agency's major programs and activities.

The agency also makes referrals to other agencies when necessary, and provides advice to individual consumers in response to inquiries, often preventing potential consumer problems from becoming formal consumer complaints.

The agency collects fees for the licensing of automobile and electronic repair dealers, and the registration of merchants who issue retail credit. A total of $137,700 was collected in Fiscal Year 1977 and Fiscal Year 1978 from the licensing of repair dealers, and approximately $90,000 is expected in Fiscal Year 1979 from the registration of merchants under the retail credit regulation.

The agency provides information to consumers through presentations to community groups and organizations, through the distribution of brochures and flyers, and through the media. The agency plans to publish a consumer information bulletin in Fiscal Year 1978.

Funding for workload includes $58,600 for five positions transferred in and $53,900 for other operating costs. The five positions, funded only for a portion of the year, will enhance the agency's investigative capabilities and will also increase the size of the agency's legal staff. The funds for other operating costs will be used for local travel; rent, communications and utilities; printing and reproduction; supplies and materials; and other services.

Rental Accommodations Office.

The Rental Accommodations Office is responsible for the administration of the District of Columbia's rent stabilization program. The purpose of this program is to protect tenants against undue and unjustifiable rent increases while permitting landlords to earn a fair return on their investment capital.

The Fiscal Year 1979 appropriated budget request for operating programs is 41 positions and $751,900.

Within this request, funding is provided for overall personnel and inflationary expenses for maintenance of the agency's programs and for support of the activities of the Rental Accommodations Commission. The agency determines rent ceilings and rent adjustments, provides client services, registers landlords whose property is covered under the rent stabilization law, performs audits of rent increases and landlords' investment returns, and rules on the propriety of eviction notices. The agency collected a total of $350,000 in fees from landlord registration in Fiscal Year 1977 and estimates that $350,000 and $300,000 will be collected in Fiscal Year 1978 and Fiscal Year 1979 respectively.

The Rental Accommodations Commission, which was established by the same act that established the Rental Accommodations Office, serves as an appellate body to hear and rule on cases in which landlords and/or tenants disagree with the decisions of the Rent Administrator. Funding for the Commission's activities is included in the agency's budget request.

Department of Finance and Revenue.

The Department of Finance and Revenue is responsible for administering and enforcing the District's tax laws; collecting and depositing District revenues, maintaining accounts receivable for major District taxes, and disbursing District funds, conducting fiscal research on revenue sources and alternative tax structures, and advising the Mayor on District tax policies and programs.

The Fiscal Year 1979 appropriated budget request for the operating programs is 597 positions and $11,866,000.

Within this request, funding is provided for overall personnel and inflationary expenses and to continue the Department's functions through its four major divisions—Assessment Administration, Tax Administration, Treasury Management, and Data Systems support.

The Assessment Division conducts a program of valuations and assessments of real and personal property for tax purposes. A major priority for Fiscal Year 1979 will be the annual assessment of all real property in the City and the amending of existing personal property tax statutes and administrative practices. Integration of a computer assisted mass appraisal system into the overall assessment program will be emphasized in Fiscal Year 1979 and will alleviate a portion of the burden of increasing assessment program workloads. The number of properties reviewed in Fiscal Year 1979 will be 147,000 compared to 67,100 in Fiscal Year 1977.

The Tax Administration Division is concerned with taxes that are self assessing on the part of the individual taxpayer. The Division's resources are applied among a variety of enforcement activities to assure that taxpayers are sufficiently informed and motivated regarding their tax liability determinations and their tax filing requirements to voluntarily comply. Priorities in Fiscal Year 1979 include continued efforts on tax delinquent and in enforcement activities begun in Fiscal Year 1977, increasing emphasis on improved support systems and an expansion in the number of out-of-city audits of multi-state firms.

$3,400,000 in additional revenue from efforts in delinquent tax collections and out-of-city audits is expected in Fiscal Year 1979.

The District Treasury receives, controls, distributes and deposits D. C. revenues and processes tax documents and payments and disburses all D. C. funds. Emphasis in Fiscal Year 1979 will be on timely deposits and disbursement of all D. C. funds.

The Data Systems plans, directs and coordinates department ADP activities. Continued emphasis in Fiscal Year 1979 will be on the computer assisted mass appraisal system and systems support in other tax areas.

Significant program shifts affecting this agency include the transfer out of the budget of the Board of Equalization and Review.

Funding for new programs and activities includes 27 positions and $619,600. Included in this amount are department-wide increases for annualization and inflation amounting to $61,600. Other increases are $78,000 for long-range fiscal planning and expanded taxpayer education and information; $73,300 for increases systems support in all tax areas; $48,800 in Assessment Administration for actual use determinations; $285,500 in tax administration for out-of-city audits, improved tax returns processing, and additional revenue officers to expand tax delinquent and enforcement activities to further reduce delinquent inventories; $72,400 in Treasury operations for two check signing machines, additonal support related to the delinquent tax efforts in Tax Administration and modifications and improvements in the system for processing income tax returns.

Office of The Corporation Counsel.

The Corporation Counsel is the chief legal officer of the District of Columbia Government and has responsibility for all of its legal affairs, except certain criminal violations which are the responsibility of the United States Attorney. Through his professional staff, the Corporation Counsel provides legal services to the departments, agencies, boards and commissions of the District government.

The Fiscal Year 1979 appropriated budget request for the Office of the Corporation Counsel is $4,044,600 to sustain an authorized employment level of 156 positions.

Within this request, funding is provided for overall personnel and operating costs and three new positions and related costs for the enforcement of child abuse laws. Management of the Office continues to be achieved through its structure of five divisions which include Appellate, Civil, Criminal, Legal Counsel and Housing and Community Development. Because of the District's unique status as the Nation's capital and relationship to the Federal Government and its duty to provide not only municipal but county and state services, the functions and responsibilities of the office are far greater than those of any other municipal law office.

The increase of three positions and $130,000 is for the continuation of the LEAA funded child abuse program.

Department of General Services.

The Department of General Services is responsible for land acquisition and rental of space for all municipal uses, construction, repairs and improvement of the physical plant of the District of Columbia Government. The Department is also responsible for procurement and contracting services and other administrative functions such as printing, records management, mail, and guard service.

The Fiscal Year 1979 appropriated budget request for operating programs is 536 positions and $17,901,000.

Within this request, funding is provided to continue basic functions of materiel management which includes procurement, contracting, supply management, printing and motor fleet management; buildings management, which includes building operations and maintenance and space management; capital programs management; and repairs and improvements to City-owned and operated facilities.

A major thrust in space and energy conservation and protective services is reflected in both the Fiscal Year 1978 and Fiscal Year 1979 budgets.

Significant program shifts affecting this agency include a base reduction of $325,400 and the transfer of the police administration telephone system from the Police Department. Other redirections of available funds within the agency provide for required personnel service adjustments, an Assistant Director for Construction Management, and one position to strengthen surplus property operations.

In addition, $5,270,000 is requested for permanent capital improvements in District-owned and operated facilities and elimination of fire hazards in the District Building.

Funding for new programs and activities includes $909,800 for buildings operations and maintenance. This amount is required to provide full funding for staffing, maintenance and utilities at the new Court Building.

Department of Economic Development.

This agency is responsible for regulatory functions including licensing and regulation of businesses, certain occupations and professions, and enforcement of codes and regulations. This includes administration of the Alcoholic Beverage Control Act and weights and measures functions.

The Fiscal Year 1979 appropriated budget request for operating programs is 156 staff positions and $2,932,700. Non-appropriated funds for the Neighborhood Commercial Revitalization Program at Minnesota Avenue and Benning Road, N. E., are in an amount of $30,000 in Federal grant funds.

Within this request, funding is provided for personnel and inflationary expenses and to maintain programs at approximately current levels. The agency will continue to focus on increasing the use of data processing systems to meet workload requirements within available resources. This budget recommends establishment of position to direct the work of the Management Information Systems Division which is responsible for computer applications in the agency.

The Fiscal Year 1979 request represents a decrease of $2,800 when compared to the estimate of appropriated funds for Fiscal Year 1978.

Public Library.

The Public Library provides library services through the Martin Luther King main facility and a network of major branch libraries, community libraries, kiosks, and bookmobiles. The Fiscal Year 1979 appropriated budget request for operating programs is $8,900,800 and 499 staff positions. Additionally, non-appropriated Federal grant funds in the amount of $399,800 and $4,900 in private funds are projected to be available in Fiscal Year 1979.

Within this request, funding is provided for overall personnel and inflationary expenses and to continue new and innovative staffing patterns and streamlining operations.

Funding for new programs and activities includes $221,600 for the Deanwood Branch Library. This branch is expected to be ready late in Fiscal Year 1979.

Department of Manpower.

The Department of Manpower was established July 1, 1974, with the responsibility to administer the employment and manpower functions transferred from the U. S. Department of Labor to the District government by Title II of the Self-Government Act of 1973. The Department is primarily responsible for planning, implementing and administering a wide range of manpower programs within the District of Columbia, including apprenticeship training and placement, job development and the administration of work experience programs.

The Fiscal Year 1979 appropriated budget request for operating programs is 16 positions and $344,800. Non-appropriated funds which support operating programs for this agency include $54,235,800 in Federal grants. The major portion of the programs and activities of this Department is financed with Federal grants from the U. S. Department of Labor.

Within this request, funding is provided for overall personnel expenses and to maintain present levels of services. During Fiscal Year 1979, the Department will strive to reduce the number of unemployed persons who have adequate job skills; promote and expand apprenticeship programs by attracting more District-based employers; and target the comprehensive training programs to the economically disadvantaged, women, young adults and those receiving public assistance.

A significant shift affecting this agency which is programmed for the budget year is the redirection of three unfunded positions from the youth employment program to the apprenticeship function. In addition, increased funding of $67,600 is provided for the cash match which the Department must meet in order to apply for and receive certain Federal grants.

Office of Youth Advocacy.

The Office of Youth Advocacy has the responsibility for planning, reviewing and evaluating all programs operated by the District of Columbia Government impacting on children and youth. This includes employment, health, counseling, recreation and training programs. The funding provided will allow the office to continue cooperation with local, Federal and private agencies.

The Fiscal Year 1979 appropriated budget request is ten positions and $245,000. This budget provides funds for personnel and the overall operation of the agency. However, in order to adjust to a base reduction of $19,300, it will be necessary to eliminate salaries in this amount of money and use the funding for operating expenses.

Department of Housing and Community Development.

The Department of Housing and Community Development is responsible for administering and enforcing the District's housing and building codes and zoning regulations. These laws and regulations provide for the health and safety of District residents in land use, and in the construction, use and occupancy of buildings, residential structures and other structures. The agency is also responsible for developing housing programs designed to maintain, improve and increase the District's housing stock. In addition, the agency is responsible for the administration of the District's public housing program, the administration of Federal grant funds under the Community Development Block Grant program, and other Federal grant programs. The agency also serves as the District's central relocation authority responsible for relocation of individuals, families and businesses displaced by public action.

The Fiscal Year 1979 appropriated budget request for operating programs is 274 positions and $6,481,200. Non-appropriated funds for this agency include approximately $59,227,000 in Federal grants which fund most of the agency's programs including the Community Development Block Grant program, public housing programs, historic preservation, and the Fort Lincoln new town.

Within this request, funding is provided for overall personnel and inflationary expenses and for maintenance of the agency's inspection compliance and enforcement activities relative to its regulatory functions. In addition, funding is provided for administrative support for these regulatory functions which were transferred to the agency in Fiscal Year 1976.

Eleven positions are being transferred-in to provide five additional inspectors necessary to enforce the building code and to provide staff for the implementation of the Home Purchase Assitance Fund, a new housing program planned for Fiscal Year 1979.

Funding for new programs and activities includes $1,000,000 for the Home Purchase Assistance Fund. This new housing program will provide for downpayment assistance in the form of deferred payment loans to assist lower income and moderate income District families in purchasing homes in the District.

Parole Board.

The Parole Board is responsible for determining whether or not an incarcerated person should be released prior to completion of a sentence. The Board is also responsible for periodically examining the quality of those who are released and determining whether individuals should remain in the community or be returned to custody.

The Fiscal Year 1979 appropriated budget is for $479,500 and 23 positions. Non-appropriated funds which support operating programs include $38,100 from the Office of Criminal Justice Plans and Analysis for the development of an Offender Based Transaction System.

Within this request, funding is provided for overall personnel expenses. There are no significant program shifts scheduled for the budget year and there are no increases for new programs or activities.

Department of Insurance.

The Department of Insurance is responsible for ensuring that the laws and regulations related to the protection of the insurance buying public are observed. Insurers are required to meet statutory financial and qualification standards and agents and brokers are licensed on an annual basis.

The Fiscal Year 1979 appropriated budget request is for $641,600 and 26 positions. This department will not receive any non-appropriated funds to support its regulatory activities. The budget request will provide funding for overall personnel expenses and essential services in the areas of medical malpractice and workmen's compensation. There are no significant program shifts planned during the budget year. There are no increases for new program thrusts or activities in Fiscal Year 1979. The Department is committed to maintaining services at the same level as the past year.

Minimum Wage and Industrial Safety Board.

The Minimum Wage and Industrial Safety Board is responsible for the administration of the City's wage-hour and occupational safety and health laws and regulations which protect over 300,000 persons employed in the District of Columbia.

The Fiscal Year 1979 appropriated budget request for operating programs totals 38 positions and $801,900. Non-appropriated funds are estimated to be available in the amount of $343,400. The major portion of this funding is Federal assistance for development of an Occupational Safety and Health Act state plan.

Within this request, funding is provided for overall personnel and inflationary expenses and to continue the Wage Order Revision Program and the Minimum Wage Compliance Program.

Recorder of Deeds.

The Office of the Recorder of Deeds files and records paper related to real property, personal property and foreign and domestic corporations functioning in the District of Columbia.

The Fiscal Year 1979 appropriated budget for this operating program is 63 positions and $875,200.

Within this request, funding is provided for overall personnel and inflationary expenses and to continue the basic functions of processing certificates of incorporation, partnership deeds, deeds of trust, security interest, auto and other liens, judgments and foreclosures. The agency also maintains an index of all land transactions and retains discharge papers. Party worksheets related to filing and recording of real property and corporation papers and filing of auto liens and chattels are expected to increase by three percent in Fiscal Year 1979. Revenue realized from the filing and [illegible]cordation of over 130,000 real estate, chattel and corporation instruments in Fiscal Year 1979 is estimated at $9,000,000.

The funding level for Fiscal Year 1979 is at the Fiscal Year 1978 level.

Public Service Commission.

The primary function of the Public Service Commission is to ensure safe and adequate electric, gas, telephone and taxicab service at reasonable, just and nondiscriminatory rates. In addition, under the realm of the Commission for budgetary and administrative purposes is the Office of the People's Counsel. This office is authorized to develop means to assure that interests of consumers of services, provided by the utilities under jurisdiction of the Public Service Commission, are adequately represented in Commission proceedings.

The Fiscal Year 1979 appropriated budget request for operating programs is 29 positions and $732,200. Non-appropriated funds which support operating programs for this agency include $45,100 in Federal grants and $45,600 for other contributions and donations.

Within this request, funding is provided for overall personnel and inflationary expenses and to maintain Commission duties involving formal rate cases, investigations, informal cases, the processing of consumer complaints, auditing of utility operations and licensing and investigative work of the Securities Bureau. Overall Commission activity in formal and informal cases is expected to increase by up to 14 percent in Fiscal Year 1979. In addition to consumer representation in Commission proceedings, the People's Counsel aids consumers through information disseminations, consultative services and technical assistance.

Significant program shifts affecting this agency include the redirection of one position from the Commission to the Office of the People's Counsel.

Funding for new program and activities includes $20,000 for space rental requirements and printing of utility regulations.

D. C. Board of Elections and Ethics.

The Board of Elections and Ethics, as administrator and adjudicator under the D.C. election laws, is responsible for registration, the maintenance of the registry and the conducting of elections. The agency also includes an Office of Campaign Finance which administers campaign finance requirements and conflict of interest provisions and a General Counsel who serves as legal advisor to the Board and its components.

The FY 1979 appropriated budget request for this operating program is 38 positions and $1,905,000.

Within this request, funding is provided for overall personnel and inflationary expenses and for the conduct of a general election in November 1978 for the Mayor, City Council Chairman, two at-large councilmembers, councilmembers representing Wards 1, 3, 5 and 6, and the D.C. Delegate to the U.S. House of Representatives. Also impacting on this budget are preparation expenditures for the November 1979 School Board election and elections of Advisory Neighborhood Commissioners. The referendum and recall measures that were presented for and received voter approval in November 1977 could also have a significant impact on administration and budget in Fiscal Year 1979. A referendum or recall issue could ultimately result in additional elections in any given year, for example. The budget also provides for the Office of Campaign Finance and General Counsel.

Significant program shifts affecting this agency include the establishment of an administrative support section to serve the entire agency. This is accomplished with redirection of available resources within the agency budget.

Funding for new programs and activities includes five positions and $52,800. This increase includes one position and $8,900 for the Board's community outreach program, which entails informing the Spanish speaking and other minorities of their voting rights and privileges. Two positions and $21,500 are added to the Office of Campaign Finance to increase audit capability. One staff attorney position and $14,400 is included in the General Counsel's Office and an accountant position and $8,000 is provided for the administrative unit. A major portion of the FY 1979 request, $650,000, will allow the Board to purchase electronic ballot readers for all 137 precincts throughout the District. This will increase the Board's vote-counting efficiency and decrease the number of hours (usually in 16 to 20 hour blocks) demanded by the tedious process of central counting. It will also decrease the possibility of errors caused by the necessity to transport ballots from 137 locations.

Office of The Surveyor.

The Office of the Surveyor, probably the oldest department in the District Government, operates under the statutory authority of the District of Columbia Code of Law (Sections 1-601 through 1-629); Reorganization Order No. 27 dated April 3, 1953, as amended; Subdivision Regulation, revised, dated May 16, 1967, as amended; and Street and Alley Closing Regulations, dated November 2, 1967. Under these legal authorities, this office is the legal office of record for all plats and subdivisions and is charged with the responsibility for the preservation of these records and the administrative responsibility for the Subdivision and Street and Alley Closing Regulations. The office is further required by law to execute any order for a survey by any court, individual or firm as well as District agencies and to provide a true certified plat within a reasonable time.

The FY 1979 appropriated budget request for this operating activity is $398,500 and an authorized staff of 31 positions. This requested budget provides for personnel and inflationary expenses required to carry out the program mission.

Overall demand for services is expected to increase by five percent in FY 1979. Revenues generated from fees charged for services is estimated at $134,505 in FY 1979; however, a new fee schedule has been proposed and when adopted will significantly increase revenues.

The funding level for FY 1979 is being maintained at the FY 1978 level.

Advisory Neighborhood Commissions.

The purpose of the Advisory Neighborhood Commissions is to advise the District Government on matters of public policy including decisions regarding planning, streets, recreation, social service programs, health, safety and sanitation in their neighborhood commission areas.

The Fiscal Year 1979 appropriated budget request is for $1,000,000.

Funding is provided in the amount of $1,000,000 for direct allocation to the 36 ANCs pursuant to section 738(c) of Public Law 93-198. Each ANC does not share equally in this fund, but rather in the same proportion that its population bears to the total D. C. population.

An increase in funding of $85,300 is provided in Fiscal Year 1979 pursuant to Public Law 93-198. The legislation authorized that an amount equal to one percent of the total assessed value of taxable D. C. real estate is to be made available to the ANCs. The estimated aggregate assessed value for Fiscal Year 1979 is $1 billion, thus the total fund available is $1,000,000.

Boxing and Wrestling Commission.

The Boxing and Wrestling Commission, composed of three members and a small staff, is the sole authority over all boxing, wrestling and martial arts events and contests in the District of Columbia. The function of the Commission is to issue all licenses and permits, and formulate, promulgate and enforce all pertinent rules and regulations.

The Fiscal Year 1979 appropriated budget request for operating programs is two positions and $40,000.

Within this request, funding is provided for overall personnel and operating expenses.

Office of Criminal Justice Plans and Analysis.

The Office of Criminal Justice Plans and Analysis is responsible for providing planning services, statistical analyses and grants management capability for the criminal justice components of the City government, such as the police, courts and corrections departments.

The Fiscal Year 1979 appropriated budget request for operating programs is five positions and $106,300. Non-appropriated funds which support operating programs for this office include $1,667,800 in Federal grants. These grants to the Office of Criminal Justice Plans and Analysis are made by the Law Enforcement Assistance Administration. Some of these grants flow through the Office of Criminal Justice Plans and Analysis as subgrants going to other District agencies having law enforcement/public safety responsibilities.

Within this request, funding is provided for overall personnel expenses in order to continue present levels of service. The entire LEAA program is currently undergoing intense study by the national administration and changes in the program are anticipated. It is not known at this time, however, precisely how these changes will impact financially and programmatically on the operation of the Office of Criminal Justice Plans and Analysis.

Office on Aging.

The D. C. Office on Aging serves as the City's umbrella agency for safeguarding the rights of senior citizens, stimulating the development of programs and services to adequately meet the needs of the elderly and assuring that adequate City resources are directed to support such programs and services.

The D. C. Office on Aging also serves as the City's representative in activities of the Urban Elderly Coalition which promotes and assists in the implementation of new laws which presently provide for immunization, legal counsel, and physical fitness programs for senior citizens.

The Fiscal Year 1979 appropriated budget request includes three positions and a total of $646,200 to operate an elderly program that generates nearly $2 million in Federal grant funds for the City's elderly. Included in the appropriated budget request are increases totaling $30,000 for workload requirements in the areas of rent, supplies, equipment and repairs to office equipment. This budget request also includes a base reduction of $6,200.

Commission on The Arts and Humanities.

The Commission on the Arts and Humanities is responsible for promoting a broad range of art and cultural activities in the District of Columbia.

The Fiscal Year 1979 appropriated budget request is three positions and $159,400.

A major objective of the Commission is to provide financial assistance to worthy local cultural or art endeavors. A major activity supported by the Commission's resources is the scholarship program for television, film, and individual art students and teachers.

Office on Latino Affairs.

The Office on Latino Affairs is the planning and technical assistance arm of the District government for District government activities pertaining to Latino affairs. Technical assistance is provided to Latino community organizations and to District government agencies in planning and monitoring policies and programs which directly affect the Latino community.

The agency's major goal is to ensure that a full range of health, education, employment and social services are available to the Latino community and that the Spanish-speaking community and its leaders participate in the planning and operation of programs which offer these services.

The enabling legislation which established the Office on Latino Affairs also established a Commission on Latino Community Development. The commission works with the Office on Latino Affairs, advises the Mayor and City Council on issues of concern to the Latino community, identifies needs of the Latino community, and makes recommendations as to how the District government should respond to these needs.

The Fiscal Year 1979 appropriated budget request for the agency's operating programs is five positions and $139,800.

Within this request, funding is provided for overall personnel and inflationary expenses and for maintenance of the agency's programs and activities. These programs include ongoing work with other City agencies with programs affecting the Latino community. Emphasis is placed on housing and employment problems of the Latino community.

The agency has had some success in facilitating the entry of Spanish-speaking persons into some of the basic craft unions. The agency also sponsored a highly successful and well-attended housing conference. Activities in the areas of housing and employment will remain among the agency's priorities for Fiscal Year 1979.

The agency plans to increase its services to youth and senior citizens with special attention to employment and education needs of these two age groups.

Board of Appeals and Review.

The Board of Appeals and Review, as an administrative agency, provides the first full evidentiary and final administrative remedy for aggrieved citizens challenging decisions of certain departments and agencies of the Government of the District of Columbia in matters of property, personal rights and privileges. The Board issues the final decision, including within its contents, findings of fact as established in the hearings and conclusions of law.

The Board has no case backlog. We are now prepared to grant a hearing within twenty-one days from time of the appeal, and to assume new categories of appeals.

Office of Business and Economic Development.

The Office of Business and Economic Development is a unit of the Executive Office which serves as a focal point for planning, implementing, and administering programs for promotion of economic activities in the District.

The operating activities of this office are 100% funded with a $300,000 Federal Community Block grant through the District's Department of Housing and Community Development.

An ongoing comprehensive economic development plan prepared by this office prescribes programs and activities to address a wide range of factors which contribute to the economic status of the District. These factors include business and commercial retention and growth trends, physical planning for the District, tourism trends, employment and population trends, tax structures, and the availability of market technology assistance to investors.

Resources of this office are available to the public and private community for pursuit of economic endeavors.

Commission on The Status of Women.

The broad objective of the Commission is to effect improvement in the status of women in the District of Columbia. Commission activity includes advocacy for legislative and administrative actions, information and referral services, publications of studies and fact sheets, stimulus and coordination for community groups, and consulting and communications with governmental and private sector policy-makers.

The Fiscal Year 1979 appropriated budget request for this operating program is two positions and $54,100. Within this request, funding is provided for overall personnel and inflationary expenses and to maintain the Commission's thrust in the areas of advocacy, appointments, child day care, coordination, counseling and emergency services, criminal justice, education, employment, health, International Women's Year, legal rights, information and referral services, and the coordination of efforts to enhance the potential of women's action groups in the District of Columbia, especially in regard to implementation of the National Plan of Action and the D. C. Plan of Action for the Decade of Women.

Funding increases in the amount of $12,000 will provide for reclassification of the Executive Director's position and two clerical positions (CETA) as well as office equipment and supplies.

Commission on Judicial Disabilities and Tenure.

The Commission on Judicial Disabilities and Tenure has jurisdiction which extends to all active and retired judges of the Superior Court of the District of Columbia and the District of Columbia Court of Appeals. Its jurisdiction embraces three areas: (1) a judge's conduct warranting disciplinary action; (2) involuntary retirement of a judge for reasons of health, and (3) evaluation of a judge at the end of his term upon his seeking reappointment.

The Fiscal Year 1979 appropriated budget request for operating programs is two positions and $82,100. Within this request, funding is provided for overall personnel and inflationary expenses and to continue the annual work program of the Commission which includes the review and analysis of the judges' Annual Financial Reports and monthly time reports review, and in some cases, investigation of complaints received and to conduct reappointment proceedings for judges eligible for reappointment.

Funding increases in the amount of $13,800 will provide for one additional position and will allow the Commission to conduct additional investigations concerning judicial conduct.

Board of Labor Relations.

The Board of Labor Relations is the neutral body available for the impartial resolution of labor management disputes involving District Government agencies, their employees and the labor organizations which represent the employees or seek to represent the employees.

The Fiscal Year 1979 appropriated budget request for this operating program is two positions and $111,600.

Within this request, funding is provided for overall personnel and inflationary expenses. The Fiscal Year 1979 request is at the Fiscal Year 1978 level.

Judicial Nomination Commission.

The Judicial Nomination Commission provides lists of nominees to the President for judicial vacancies in the Superior Court and the Court of Appeals. The Fiscal Year 1979 appropriated budget request for operating programs is $32,300. Within this request, funding is provided for overall personnel and inflationary expenses and to continue developing lists of judicial nominees. Although only one known vacancy will occur in Fiscal Year 1979, unexpected vacancies will occur through resignation, death or unwillingness to seek reappointment. Funding for new programs and activities includes $4,800, which is needed to supplement funds for Commission members' compensation and $10,000 for additional contractual services for background investigations of potential judicial nominees.

Law Revision Commission.

The Law Revision Commission recommends necessary changes in the District's laws in order to modernize and clarify the City's code. The Fiscal Year 1979 appropriated budget request for operating programs is eight positions and $390,200. Within this request, funding is provided for overall personnel and inflationary expenses and to continue making proposals for changes in the criminal, civil and administrative codes. Commission members plan to have completed work on a criminal code by July 1978, an estimated six months in advance of the statutory completion date of January 1979 and will begin emphasis on civil and administrative areas of the City's laws. Funding for new programs and activities includes $19,000 which allows the Commission to utilize staff on a permanent basis in Fiscal Year 1979.

Educational Institution Licensure Commission.

The five-member Educational Institution Licensure Commission is responsible for licensing private educational institutions in the District of Columbia and for establishing minimum standards concerning fiscal responsibility, business practices and the quality of education of these institutions. The Commission is also responsible for serving as the state approving agency for veterans educational benefits and for advising the Mayor and Council on the educational and vocational training needs of the District.

The Fiscal Year 1979 appropriated budget request for the Commission is two positions and $81,900; this will provide initial funding for the Commission. Of this amount, $10,100 is being transferred from the Board of Trustees of the University of the District of Columbia which formerly was responsible for licensing private institutions of higher education in the District. The balance of the request represents an increase.

Within this request funds are provided for overall personnel, inflationary and general operating expenses of the Commission. Major activities of the Commission include evaluating educational institutions requesting a license to operate in the District, conducting periodic onsite reviews of private educational institutions in the District, maintaining a permanent file of essential academic and institutional records from institutions whose operations are discontinued, and assessing the educational and vocational training needs of the District.

Commission on Healing Arts Licensure.

The Commission on Healing Arts, composed of 12 members, is responsible for developing qualifications criteria for licensing medical practitioners, issuing medical licenses, and monitoring the practices of persons in the healing arts. The District of Columbia Corporation Counsel serves as legal advisor to the Commission. The objective of the Commission is to provide for quality medical services in the District, commensurate with the standards set forth by the American Medical Associations' Council on Medical Education Training, and the overall standards promulgated by the American Medical Association.

The Fiscal Year 1979 appropriated budget request is three positions and $199,300; this will provide initial funding for the Commission. Of this request, one position and $81,600 are transferred from the Department of Economic Development. The balance of the request is for new funds to support the Commission's activities.

Board of Equalization and Review.

The Board of Equalization and Review is an independent board composed of 15 members appointed by the Mayor upon advice and consent of the City Council. The Board is responsible for hearing and acting upon taxpayers' appeals with respect to the assessed values placed on their properties by the District assessors for the purpose of real property.

The Fiscal Year 1979 appropriated budget request for this operating program is $114,600.

Within this request, funding is provided for overall personnel and inflationary expenses and to continue the function of reviewing taxpayers' appeals. The number of appeals in Fiscal Year 1979 is expected to increase by 29% as a result of annual assessment cycle requirements.

Significant program shifts affecting this agency include the transfer of the Board from the budget of the Department of Finance and Revenue to the Office of Special Mission Activities.

Manpower Services Planning Advisory Council.

The primary function of Manpower Services Planning Advisory Council is to provide advice and guidance to the Mayor on matters pertaining to manpower program plans, goals, policies and procedures. The Manpower Services Planning Advisory Council is responsible for monitoring and evaluating all CETA funded employment and training programs in the District of Columbia and provides a continuing analysis on employment needs, training and related services. This office is funded by Comprehensive Employment and Training Act (CETA) funds' Special Grants for Governors, Title I.

Metropolitan Washington Council of Governments.

The Council of Governments is the cooperative association of the 15 major cities and counties of the Washington Metropolitan area including the District of Columbia. It was organized in 1957 and is one of more than 300 such organizations throughout the United States. It coordinates activities involving these local governments in such fields as transportation, law enforcement, environmental management, housing and community development. It also is the official planning agency for metropolitan Washington by designation of the departments of Housing and Urban Development (HUD), Transportation (DOT), and Environmental Protection Agency (EPA).

The Council of Governments provides the mechanism for interlocal and interstate cooperation in metropolitan Washington. It provides a meeting place for both elected officials and their staffs where they can come together, discover their mutual interests, and work toward more efficient means of meeting urban metropolitan needs. The City's Fiscal Year 1979 contribution is $216,700.

A part of the appropriation to Council of Governments is used to provide funds to the Washington Ear, Inc., a closed circuit radio service for the blind and physically handicapped in the metropolitan Washington area. The number of persons reached by this service increases steadily each month; the service is also available in four area hospitals, many nursing homes and other institutions. The City's Fiscal Year 1979 request for the Washington Ear is $22,800.

Washington Convention and Visitors Association.

The Washington Convention and Visitors Association carries out programs to attract conventions to the City, encourage tourism and disseminate information about the District of Columbia to individuals and organizations throughout the nation.

The Fiscal Year 1979 appropriated budget request is for $100,000 which represents the District of Columbia's contribution to the Association. This amount reflects a 50% reduction to the FY 1978 funding level. These funds are supported by funding raised by the Association through contributions from the Washington area business community.

Minority Business Opportunity Commission.

The Minority Business Opportunity Commission is composed of seven members and a small staff, established to oversee the implementation of minority participation in contracting. Specific goals of the Commission are to eliminate discrimination in the allocation of contracts, business financing and bonding practices to achieve full and equal opportunities for minority business enterprises.

The Fiscal Year 1979 appropriated budget request for operating programs is six positions and $175,000; this will provide initial funding for the Commission.

Within this request, funding is provided for overall personnel and operating expenses to develop and implement programs to achieve the goals of the Commission.

D. C. Chamber of Commerce.

The D. C. Chamber of Commerce carries out programs to develop new tourist information materials, attractions and entrepreneurial ventures that will be geared to the minority interests in the tourism and convention business of Washington. The Fiscal Year 1979 appropriated budget request is for $52,000 which represents the District's contribution to the D. C. Chamber of Commerce.

PUBLIC SAFETY

Public Safety (Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Operating Expenses			
Metropolitan Police Department	$ 137,892.2	$ 140,409.8	$ 141,398.6
D. C. funds	136,818.1	138,971.5	140.004.1
Federal grants	68.9	44.1	—
Other grants and non-D.C. reimbursements	1,005.2	1,394.2	1,394.5
Fire Department	50,248.1	51,375.0	52,033.2
D. C. funds	50,245.5	51,374.0	52,032.2
Other grants and non-D.C. reimbursements	2.6	1.0	1.0
Court of Appeals	1,899.1	2,039.0	2,039.0
D. C. funds	1,899.1	2,039.0	2,039.0
Superior Court	21,662.8	21,359.3	21,053.1
D. C. funds	21,658.3	21,354.8	21,048.6
Other grants and non-D.C. reimbursements	4.5	4.5	4.5
D. C. Court System	3,903.0	5,601.4	4,651.4
D. C. funds	3,903.0	5,601.4	4,651.4
Public Defender Service	2,219.9	2,491.0	2,660.5
D. C. funds	2,021.9	2,310.5	2,660.5
Federal grants	198.0	180.5	—
Bail Agency	778.0	926.3	1,017.1
D. C. funds	760.0	926.3	1,017.1
Federal grants	18.0	—	—
National Guard	308.8	284.4	281.5
D. C. funds	308.8	284.4	281.5
Department of Corrections	51,988.2	52,761.8	52,944.6
D. C. funds	49,268.0	50,259.6	50,678.4
Federal grants	159.3	159.2	9.2
Other grants and non-D.C. reimbursements	2,560.9	2,343.0	2,257.0
TOTAL	270,900.1	277,248.0	278.079.0

D. C. funds	266,882.7	273,121.5	274,412.8
Federal grants	444.2	383.8	9.2
Other grants and non-D.C. reimbursements	3,573.2	3,742.7	3,657.0
Capital Funds			
Metropolitan Police Department	—	—	3,517.2
D. C funds	—	—	3,517.2
Fire Department	—	2,308.5	530.0
D. C. funds	—	2,308.5	530.0
Department of Corrections	—	12,351.0	—
Federal grants	—	12,351.0	—
TOTAL	—	14,659.5	4,047.2
D. C. funds	—	2,308.5	4,047.2
Federal grants	—	12,351.0	—

Metropolitan Police Department

The Metropolitan Police Department is the principal police agency for the District of Columbia. It is responsible for the detection and prevention of crime, the protection of life and property, the enforcement of laws and regulations, and the maintenance of peace and order within.

The recommended operating budget for Fiscal Year 1979 is $140,004,100 and 4,673 positions. This includes an authorization for an additional 164 civilian positions to replace an equal number of uniformed positions to be lost by attrition during the year. The reduction in uniformed strength will be from 3,970 positions at the beginning of the fiscal year to 3,806 at its end. Civilian strength will increase from 623 to 787.

This request is composed of $87,681,500 in salaries and benefits to provide for the operation of all current programs at approximately their present levels of activity; $6,301,800 for the purchase of services, supplies, materials and equipment; and $46,020,800 to discharge the Department's statutory obligations for the payment of pensions and retirement refunds.

Included in the pension funding is an estimated $9,239,000, which is reimbursed to the District of Columbia for payments to Federal pensioners, and $620,000 for refund of payroll deductions to officers who resign before reaching retirement age. Also included in the budget is an estimated $375,000 to pay for Police and Fire Clinic services to employees of other agencies.

The funding level represents a total increase of $1,032,600. Since an increase of $1,326,400 is required for pension payments, the amount requested for normal operating expenses is $293,800 less than the current year allotment.

In addition, $3,517,200 in capital improvement funds is requested for enlargement of the First District Station House.

Fire Department

The Fire Department has responsibility for protecting the City from fire through fire prevention activities, code enforcement and provision of around-the-clock firefighters and equipment for suppression of fires. The Fire Department also provides emergency ambulance service. The voice alarm system should be in full operation in Fiscal Year 1979.

The Fiscal Year 1979 appropriated budget request for operating programs is 1,566 positions and $52,032,200.

Within this request, funding is provided for overall personnel and inflationary expenses and to continue staff services which include management, communications, apparatus maintenance and property management. Funds for continuation of approximately 25,100 prevention inspections, for the extinguishment of an estimated 10,000 fires, for the maintenance of 52 firefighting companies and for an estimated 76,000 emergency ambulance responses are also included in this request. The emergency ambulance service will generate an estimated $400,000 in fee collection in Fiscal Year 1979. The Fiscal Year 1979 budget request also provides $18,539,100 for payments to retired firefighters and their beneficiaries.

In addition, $530,000 is requested for capital improvements to replace obsolete firefighting vehicles.

Funding for new programs and activities includes $432,500 and 22 positions for the addition of a specialized rescue squad company. This company will strengthen the Fire Department's ability to handle emergencies in the subway, in automobile and other accidents and to provide relief to firefighters when necessary.

District of Columbia Court of Appeals

The District of Columbia Court of Appeals is the highest judicial tribunal in the City. The Court of Appeals hears cases from the Superior Court; appeals from the Court of Appeals are heard only by the U.S. Supreme Court.

The Court of Appeals has requested $2,083,800 and 69 positions for Fiscal Year 1979. This request includes increases over Fiscal Year 1978 of $19,300 for within grades, $21,100 for terminal leave costs, and $4,400 for additional mailing costs.

The Court has also requested their budget be incorporated in a separate appropriation title entitled "Judiciary."

The Mayor has recommended $2,039,000 for 69 positions for the Court of Appeals, which is the same amount recommended for Fiscal Year 1978. The Mayor also recommends that any additional needs for the Court of Appeals be financed through redirection of current court resources that will no longer be required when the Department of Transportation assumes responsibility for administrative adjudication of traffic violations in Fiscal Year 1979.

Superior Court of The District of Columbia

The Superior Court is the City's unified court of general jurisdiction.

The Superior Court has requested 930 positions and $21,048,600 for Fiscal Year 1979. This request includes a transfer of 35 positions and $439,000 to the Department of Transportation. That Department will adjudicate most traffic violations administratively in Fiscal Year 1979, thus relieving the Court of the need to process cases through judicial means.

The request also includes increases over Fiscal Year 1978 of $132,800, including $56,100 for judges' annuities, $50,000 for supplies and materials, and $26,700 to assume certain costs associated with Project SCORP, which provides decentralized probation services.

The Superior Court has also requested their budget to be incorporated in a separate appropriation title entitled "Judiciary."

The Mayor has recommended $21,048,600 and 920 positions for the Superior Court in Fiscal Year 1979. This recommendation includes a transfer of 35 positions and $439,000 to the Department of Transportation, a transfer of 14 vacant positions to the Public Defender Service, redirections of 42 positions and $701,000 to be identified by the Courts, and $132,800 for increases to be identified by the Courts.

District of Columbia Court System

The District of Columbia Court System is the administrative arm of the District's Superior Court and Court of Appeals.

The Court System has requested 63 positions and $5,042,000. This request includes a decrease of $600,000 for equipment which was needed only in Fiscal Year 1978 for the new Court Building, now scheduled for occupancy early in 1978. The request also includes increases of $29,600 for within grades, and $11,000 for printing.

The Mayor has recommended 63 positions and $4,651,400 for the Court System, which includes a reduction of $600,000 for Court building equipment, and a transfer of $350,000 in funds for payment to private attorneys to the Public Defender Service. The Mayor also recommends that additional needs for the Court System be financed through redirection of resources from the Superior Court. These resources are currently devoted to the judicial adjudication of traffic violations.

Public Defender Service

The Public Defender Service provides legal representation to indigent defendants in the City's courts. The Service also coordinates the administration of the Criminal Justice Act Program. Additionally, Public Defender Service provides investigations, social services and consultation to the City's private bar.

The Fiscal Year 1979 appropriated budget request for operating programs is 113 positions and $2,660,500.

Within this request, funding is provided for overall personnel and inflationary expenses and to continue representation in approximately 4,300 cases, complete 600 investigations, refer an estimated 500 persons to social services, and interview 28,000 persons regarding their eligibility for free legal representation.

Significant program shifts affecting this agency include $350,000 and 14 positions recommended to be redirected from the City's Criminal Justice Act funds. This redirection will result in increasing the Public Defender Service's capability to represent juveniles in the Superior Court's Family Division.

Bail Agency

The Bail Agency recommends to a judge whether an arrestee can be released from jail prior to trial. If the arrestee is released, the Bail Agency then ensures that the arrestee complies with the conditions of release.

The Fiscal Year 1979 appropriated budget request for operating programs is 57 positions and $1,017,100.

Within this request, funding is provided for overall personnel and inflationary expenses to continue making an estimated 29,000 recommendations on arrestees, and to continue supervising approximately 4,500 arrestees at any one time. Significant program shifts affecting this agency include the administration of funds for third-party custodians; these custodians will expand the agency's capacity to supervise released arrestees. Funding for new programs and activities includes $21,600 for the cost associated with the rental of computer terminals to continue development of the Automated Bail Agency Data Base (ABADABA), and $40,600 to strengthen supervision of pre-trial releasees.

District of Columbia National Guard

District of Columbia funds are required to operate the District of Columbia National Guard for maintenance of "militia" records facilities and to secure the property of this agency. The D.C. National Guard performs two separate but related roles. It is a component of the Department of Defense, fully supported by Federal funds for that mission, and assists local authorities in emergency and ceremonial situations. By statute, the Commanding General of the D.C. Guard is appointed by the President and reports to Federal as opposed to local authorities.

Federal funds are, and have been, furnished to the D.C. National Guard by the Department of Defense to support all military operations including compensation, supplies and equipment. The Fiscal Year 1979 appropriated budget request for operating funds is 19 authorized positions and $281,500. This amount includes a base reduction of $10,700 in the area of personal services and an increase of $7,800 for inflationary increases in the areas of communications, supplies and equipment.

The D.C. Guard actively participates in many community activities without cost to the City. Especially noteworthy is the annual Youth Leader's Program which involves providing a leadership experience to 150 high school youth at a summer training encampment.

Department of Corrections

The responsibility of the Department of Corrections is to provide detention facilities for those persons in a pre-trial and pre-release status as well as those individuals entrusted to the Department for long-term sentencing. The Department is charged with the care, custody and reintegration into the community of persons sentenced by the Courts; residents are housed at both the District's Detention Center and at the Lorton Reservation as well as in the community centers. Security, education, medical and counseling programs are provided for all residents and for those persons on parole.

The Fiscal Year 1979 appropriated budget request for Department operations is $50,678,400. Incorporated in this request is authority for 1,976 positions and support for the varied programs containing the Department's mandate. Non-appropriated funds lending support to program areas include $1,964,000 in Federal Bureau of Prisons reimbursements.

This budget request will provide funding for 1,861 positions coupled with funding to provide basic care requirements for residents, other essential operating expenses and funding to meet the payment to the Federal Bureau of Prisons for D.C. Code violators housed in their facilities. The staffing level depicted in this request is 239 less than the Fiscal Year 1978 Congressional authorization. In order to adequately fund operating expenses, it is critical that funding levels in the 03 category be increased at the sacrifice of personnel monies.

The Lorton Central Facility will be staffed to service an inmate level of 900, whereas, in September 1977, there were actually 1,180 residents. At the New Detention Center, correctional coverage will be provided to maintain security for 960 residents. The Jail Annex will function at a staffing level that will support 400 inmates. The security coverage at the Ugast Center will be reduced from 26 positions to three.

Significant shifts in funding affecting this agency have been necessitated by the operating expenses pressures that must be met. The operating expense problem is complicated by the continuing decrease in reimbursements received for Federal Code violators housed in District facilities. These pressures have forced the Department to structure the Fiscal Year 1979 budget with adequate funds for operating expenses, resulting in the redirection of funds from personal services (correctional officers) to operating expenses. The redirections are made on the assumption that the resident population will decline.

Increases provided for in this budget request include: (1) $17,500 for payment to the Federal Bureau of Prisons for the care and custody of D.C. Code violators housed in Federal facilities—this is a statutory requirement; (2) $350,700 for the increased cost of food provided for the resident population; (3) $105,900 for increased fuel cost; and (4) $50,000 for increased printing costs.

Education (Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Operating Expenses:			
Public Schools	$ 264,388.9	$ 273,114.3	$ 279,601.6
D. C. funds	224,192.4	232,505.3	239,043.6
Federal grants	39,807.6	40,352.2	40,352.2
Other grants and non-D.C. reimbursements	388.9	256.8	205.8
University of the District of Columbia:			
Board of Trustees	248.5	641.7	—
D. C. funds	248.5	641.7	—
Georgia Avenue/Harvard Street Campus (DCTC)	5,906.3	5,787.3	—
D. C. funds	5,017.8	5,292.9	—
Federal grants	793.1	399.0	—
Other grants and non-D.C. reimbursements	95.4	95.4	—
Mount Vernon Campus (FCC)	28,931.1	29,211.7	—
D. C. funds	22,643.5	23,911.7	—
Federal grants	5,616.8	4,661.4	—
Other grants and non-D.C. reimbursements	670.8	638.6	—
Van Ness Campus (WTI)	17,632.5	16,699.1	—
D. C. funds	12,364.0	12,873.9	—
Federal grants	5,259.2	3,778.5	—
Other grants and non-D.C. reimbursements	9.3	46.7	—
Total, University of the District of Columbia	52,718.4	52,339.8	52,981.9
D. C. funds	40,273.8	42,720.2	43,855.0
Federal grants	11,669.1	8,838.9	8,362.6
Other grants and non-D.C. reimbursements	775.5	780.7	764.3
TOTAL	317,107.3	325,454.1	332,583.5
D. C. funds	264,466.2	275,225.5	282,898.6
Federal grants	51,476.7	49,191.1	48,714.8
Other grants and non-D.C. reimbursements	1,164.4	1,037.5	970.1
Capital Funds			
Public Schools	834.0	18,470.5	15,400.0
D. C. funds	834.0	18,470.5	15,400.0
University of the District of Columbia	—	57,446.4	2,500.0
D. C. funds	—	56,696.4	2,500.0
Federal grants	—	750.0	—
TOTAL	834.0	75,916.9	17,900.0
D. C. funds	834.0	75,166.9	17,900.0
Federal grants	—	750.0	—

Public Schools

The Public Schools has the responsibility for the development and operation of a program that offers educational opportunities from prekindergarten through grade twelve. Regular programs are offered during day hours at 190 schools. This is supplemented by afternoon and evening programs for adults and community activities at 24 schools.

The Fiscal Year 1979 appropriated budget recommendation of the City for operating programs is a funding level of $239,043,600. This recommendation was based on data developed by the Superintendent of Schools and transmitted to the City with the approval of the Board of Education. This agency's nonappropriated funds are an estimated $40,352,200 in Federal grants and $205,800 in Federal and other reimbursements to the District.

In determining the City's recommended funding level, consideration was given to the materials provided by the Public Schools. The 1977 and 1978 budgets were reviewed together with the mandatory items as defined by the Public Schools. Information systems and the data they produced were checked for validity. Consideration was given also to the influence of other factors on the level of service requirements. This included the significance of school closings and the 10,013 decline in student population between October 1975 and October 1977.

The following increases were defined by the Public Schools and included by the City:

• Increased pay costs because of TSA personnel moving to a higher pay level through obtaining a more advanced degree or more graduate credits	$ 822,000
• An increase in health benefit costs	450,000
• Within grade salary increases for all categories of school staff	3,344,700
• Staffing and equipment for modernized school facilities at Burrville Elementary and Roosevelt Senior High Schools	350,000

The Public Schools submitted other increases as mandatory that the City would accept as valid. However, we believe these should be funded by redirections from other program sources. They include inflation costs for supplies and utilities. Further increases for pay increases that might be approved in Fiscal Years 1978 and 1979 are not included in the final funding level recommendations.

Special Education—It is the City's position, supported by an opinion of the Corporation Counsel, that Public Law 94-142, which is the Federal legislation governing the education of handicapped children applies to all children ages five to eighteen years. The addition of 65 positions and an annual budget increase of $1,103,000 together with the other actions on special education proposed in this budget will enable the City to meet basic requirements. A total of $700,000 is requested in the Fiscal Year 1979 budget; all positions required are budgeted for eight months funding.

The City will continue to act cooperatively in the implementation of Judge Waddy's decree in the Mills case and P. L. 94-142.

In addition to the general strengthening of the Public Schools program, certain specific items have been added by the Mayor to this budget for special education:

- Additional substitute teaching services at Forest Haven and Children's Center.
- Educational and support services for 90 children at Forest Haven who can go the District Public Schools for their education.

Funds for substitute teachers are included in the budget for the Department of Human Resources. Support service costs in the amount of $505,500 and 30 positions have been agreed to by Public Schools as an additional increase to their budget.

Community Schools—The City has accepted the prior actions of the Public Schools on the Community Facilities Schools program. Accordingly, we have placed additional funding in this budget of $200,000 and nine positions specifically for the following three community facilities schools: Marie Reed (Morgan); Shaw and Fort Lincoln #1. These funds are added with the assumption that the Board of Education will provide the same minimum staffing and support to these schools that has been given to the other three community facilities schools to support community activity at such schools.

Teachers' Retirement Contribution—An amount of $21,705,000 within the funding level of $239,600 is the needed Fiscal Year 1979 contribution to the Teachers Retirement Fund to maintain the reserve in that fund at $62 million. Accordingly, the City will designate this amount in appropriation language as a contribution that must be made.

University of the District of Columbia—The Univer- of the District of Columbia, the only public institution of higher education in the city, is responsible for providing a comprehensive program of higher education to meet the needs of the citizens of the District of Columbia.

The Fiscal Year 1979 appropriated budget request is 1,529 positions and $43,855,000. Non-appropriated funds which support operating programs for the University include $8,362,600 in Federal grants, $47,400 in non-District reimbursements, and $716,900 in other contributions and donations.

Within this request, funding is provided for overall personnel and inflationary expenses, and for the maintenance of current programs and activities of the Board of Trustees and the former component institutions of the University—the District of Columbia Teachers College, the Federal City College, and the Washington Technical Institute. (The geographic sites of these former institutions have been renamed, respectively, the Georgia Avenue/Harvard Street Campus, the Mount Vernon Campus, and the Van Ness Campus.) The full-time equivalent (FTE) student enrollment for Fiscal Year 1979 is budgeted at the same FTE LEVEL AS Fiscal Year 1978.

Current programs of the University include 53 undergraduate and 14 graduate degree programs, a special undergraduate teacher education program, and 45 career and technical education programs leading to certificates and associate degrees. In addition, the University offers a broad public service program to the community which includes a continuing education program and the Cooperative Extension Service.

Significant program shifts include a complete restructuring of the University's organization and programs as a result of the consolidation of the District's three former public institutions of higher education on August 1, 1977.

In addition, $2,500,000 is requested in capital funds for equipment for Phase II of the construction program at the Van Ness Campus. The first stage of the Van Ness Campus has been completed and is in use, and the second stage is under construction. The University's capital program provides for the development of two permanent campuses—the Van Ness Campus at Connecticut Avenue and Van Ness Streets, N.W., and the Mount Vernon Campus in the Mount Vernon Square area near downtown Washington.

RECREATION

Recreation (Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Operating Expenses:			
Recreation Department	$ 20,752.1	$ 20.098.5	$ 21,260.3
D. C. funds	18,241.2	18,364.6	18,677.4
Federal grants	2,504.4	1,727.4	2,576.4
Other grants and non-D.C. reimbursements	6.5	6.5	6.5
National Children's Island	—	416.6	—
D. C. funds	—	196.6	—
Federal grants	—	220.0	—
TOTAL	20,752.1	20,515.1	21,260.3
D. C. funds	18,241.2	18,561.2	18,677.4
Federal grants	2,504.4	1,947.4	2,576.4
Other grants and non-D.C. reimbursements	6.5	6.5	6.5
Capital Funds			
Recreation Department	2,128.9	2,597.9	1,200.0
D. C. funds	1,292.0[1]	301.5	—
Federal grants	836.9	2,296.4	1,200.0

[1] *Sursum Corda Neighborhood Center*

Department of Recreation

The Department of Recreation has the responsibility for developing and operating a comprehensive program of public recreation and culture to offer opportunities for leisure time and creative activities which reflect the interest of its public constituents.

The Fiscal Year 1979 appropriated budget request for operating programs is 764 positions and $18,677,400. Non-appropriated funds, which support operating programs for this agency, include $2,576,400 in Federal grants.

Within this request, funding is provided for overall personnel and inflationary expenses, and to maintain 139 community recreation facilities, 49 neighborhood pools, 15 day camps, (4 for mentally retarded and physically handicapped and 11 for cooperative play), 21 mobile recreation programs, 34 child day dare and after school centers, and 40 cooperative play centers. A broad range of free programs and activities are offered daily, day and evening, serving children, teenagers, adults, senior citizens, the handicapped, as well as the mentally retarded of all ethnic groups.

Significant program shifts affecting this agency were the transfer to this Department of the National Children's Island, a comprehensive recreation park with special features for handicapped and mentally retarded children, with parts of the project to be completed and operable by the summer of 1978.

Funding for new programs and activities includes $12,200 for a new building for Lincoln Center for the Mentally Retarded and Physically Handicapped, and $104,000 for maintenance of 15 neighborhood parks now under the jurisdiction of the D.C. Department of Housing and Community Development.

HUMAN RESOURCES

Human Resources (Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Operating Expenses			
Department of Human Resources	$ 439,695.7	$ 460,468.0	$ 430,473.5
D. C. funds	272,163.2	291,396.9	266,983.2
Federal grants	102,733.7	101,118.4	94,343.2
Other grants and non-D.C. reimbursements	64,798.8	67,952.7	69,147.1
D. C. General Hospital	—	—	46,391.6
D. C. funds	—	—	27,491.6
Other grants and non-D.C. reimbursements	—	—	18,900.0
TOTAL	439,695.7	460,468.0	476,865.1
D. C. funds	272,163.2	291,396.9	294,474.8
Federal grants	102,733.7	101,118.4	94,343.2
Other grants and non-D.C. reimbursements	64,798.8	67,952.7	88,047.1
Capital Funds			
Department of Human Resources	3,300.0	625.0	3,275.0
D. C. funds	3,300.0	—	3,275.0
Federal grants	—	625.0	—
D. C. Obligations	547.6	3,893.5	1,247.6
D. C. funds	547.6	3,893.5	1,247.6
TOTAL	3,847.6	4,518.5	4,522.6
D. C. funds	3,847.6	3,893.5	4,522.6
Federal grants	—	625.0	—

Department of Human Resources. The Department of Human Resources (DHR) administers a variety of programs designed to meet the health and welfare needs of the District residents, particularly those who are aged, infirm, dependent, disabled, ill or have little or no income.

The Fiscal Year 1979 appropriated budget request for operating programs is 6,187 positions and $266,983,200. Non-appropriated funds which support operating programs for this agency include $94,343,200 in Federal grants, $69,083,600 in Federal reimbursements to the District, and $63,500 for other contributions and donations.

Within this request, funding is provided for overall personnel and inflationary expenses, and to continue or maintain programs providing income maintenance and related social services, vocational rehabilitation, the care of dependent, delinquent and neglected children, the care of the physically and mentally ill and the treatment and prevention of alcoholism and narcotic addiction.

The facilities of the department include: nine intake centers where people may apply for food stamps, Medicaid and public assistance; seven food stamp intake centers; eight decentralized service centers where people are provided protective services for adults and children, rehabilitation services, foster care, adoption planning, day care referrals and youth services; two emergency family shelters where homeless families are temporarily sheltered; four institutions for the care of delinquent children; one employment and evaluation center where vocational assessment and skill evaluation services are provided; six maternal and child health centers where comprehensive prenatal, post-natal and family services are provided.

The department also operates nine neighborhood health centers where preventive health, primary medical dental care is provided; four geriatric health clinics where the elderly are provided with health care; eleven locations where comprehensive dental care is provided to school children; two VD clinics; two hospitals; four Community Mental Health Centers (one is operated by St. Elizabeths) where comprehensive mental health services are provided; an alcoholic detoxification center where the diagnosis, treatment, rehabilitation and appropriate educational services for developmentally disabled persons are provided; a forensic psychiatry service that provides psychiatric screening, diagnosis, treatment, consultation, education, training, and follow-up referral in adult, juvenile and intra-family court cases; one center providing emergency mental health services; one central intake center for narcotics addicts, and five out-patient treatment centers for narcotics addiction.

In addition, there is a facility for the Office of the Chief Medical Examiner, a computer center, an office where birth and death records are kept and an information and referral center. Most of these facilities operate during regular business hours, some provide service at all hours and some of the clinics have evening hours.

Fees are charged for services, however, no one is barred from receiving a service because of indigency. Health clinic fees range between $14.75 for a podiatry visit, to $50.50 for a visit to a children and youth clinic. In-patient care costs $75.50 per day at Glen Dale Hospital, $67.00 per day at Forest Haven and $22.75 per day at the Rehabilitation Center for Alcoholics.

Projected fee collections for Medicaid, Medicare, third-party insurance, and pay patients for the years 1976, 1977 and 1978 are $24,569,000, $29,500,000 and $25,977,000. The decline between 1977 and 1978 is due to a special effort on-going during Fiscal Year 1977 to collect for prior years at D.C. General and Glenn Dale Hospitals.

Funding of the major programs for Fiscal Year 1979 is proposed as follows:

Payments assistance	$ 115,520,400
Social rehabilitation	44,226,000
Mental health	51,759,600
Community health	31,483,400
Narcotics treatment	4,097,500

In addition $19,896,300 is requested for executive direction and support. For the Medicaid program, the estimated vendor payments are $107,000,000 and the estimated reimbursements are $69,000,000.

The D.C. General Hospital will be transferred-out in compliance with the D.C. General Hospital Commission Act. This request incorporates the budgetary transfer.

Other significant program shifts are the abolishment of the Bureau of Developmental Disabilities and the elevation of Forest Haven to bureau level. This institution's superintendent now reports directly to the Mental Health Administrator.

The Community Care Services Division of the Bureau of Youth Services was reduced by half in Fiscal Year 1977. In Fiscal Year 1979, the remaining staff will be transferred to the Cedar Knoll and Oak Hill facilities.

In addition, $3,275,000 is requested for capital improvements that will provide for permanent improvements at D.C. Village, Forest Haven and the dog pound. A reprogramming is recommended to initiate the construction of a replacement for the existing Receiving Home.

Funding for new programs and activities includes $690,000 requested to provide for the legal reserve requirement for the student loan program; $781,600 to annualize a prior year request for the Bureau of Eligibility Determination; $2,834,300 to meet the inflationary cost increases of the Medicaid program; $906,700 to annualize the Fiscal Year 1978 improvement in the public assistance payment level; $3,544,500 to provide for an estimated 25,887 AFDC regular cases, and 3,960 GPA cases; and $1,512,600 to provide a 5% improvement in the public assistance payment level.

To implement the recently adopted Child Abuse Act, $246,600 is requested. Additional increases requested include: $225,000 to provide foster care for hard to place children; $1,487,900 for increased rates for board and care and for the increased cost of clothing for children in foster care; and $965,000 for the tuition of foster children placed out-of-city and for an increased number of group foster care contracts.

Funds for staffing of the soon to open therapy building at Forest Haven are requested in the amount of $501,000. An amount of $80,000 is requested to provide for the employment of substitute teachers at Forest Haven, Cedar Knoll and Oak Hill.

D.C. General Hospital. D.C. General Hospital provides public hospital care and services to all persons, regardless of ability to pay.

The Fiscal Year 1979 appropriated budget request for operating programs is $27,491,600. Non-appropriated funds which support operating programs for the hospital include $11,000,000 in Medicaid Trust Fund receipts, $5,400,000 in Medicare reimbursements, $1,800,000 in insurance reimbursements, $200,000 in private pay patient receipts, and $500,000 for reimbursement of fuel costs by the Department of Corrections.

Within this request, funding is provided for overall personnel and inflationary expenses, to maintain 600 inpatient beds, and to service an estimated 295,000 emergency and outpatient visits. The hospital anticipates an average of 500 patients per day, with 22 average patients in intensive care, and anticipates performing over 17,000 operations and other surgical procedures.

Significant program shifts affecting the hospital include the transfer of the hospital from the Department of Human Resources to an independent entity governed by a D.C. General Hospital Commission. The hospital will be financed through a D.C. General Hospital Fund, which will receive City funds as well as other Federal and City fund entitlements.

Funding for new programs and activities includes $1,607,400 in City appropriated funds. This increase is needed to cover increasing expenditures throughout the hospital that cannot be met through receipts from other sources.

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TRANSPORTATION

Transportation (Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Operating Expenses			
Department of Transportation	$ 29,755.8	$ 29,363.6	$ 35,055.8
D. C. funds	27,327.6	26,119.0	32,061.6
Federal grants	1,168.6	1,647.4	1,121.2
Other grants and non-D.C. reimbursements	1,259.6	1,597.2	1,873.0
Washington Metropolitan Area Transit Commission	55.1	73.2	72.3
D. C. funds	55.1	73.2	72.3
School Transit Subsidy	3,853.7	4,300.0	4,385.0
D. C. funds	3,853.7	4,300.0	4,385.0
Washington Metropolitan Area Transit Authority	25,382.0	31,649.3	41,032.8
D. C. funds	25,382.0	31,649.3	41,032.8
TOTAL	59,046.6	65,386.1	80,545.9
D. C. funds	56,618.4	62,141.5	77,551.7
Federal grants	1,168.6	1,647.4	1,121.2
Other grants and non-D.C. reimbursements	1,259.6	1,597.2	1,873.0
Capital Funds			
Department of Transportation	34,344.0	36,506.9	20,794.0
D. C. funds	8,733.0	8,099.0	6,307.0
Federal grants	25,611.0	28,407.9	14,487.0
Washington Metropolitan Area Transit Authority	6,956.1	8,353.5	—
D. C. funds	6,956.1	8,353.5	—
TOTAL	41,300.1	44,860.4	20,794.0
D. C. funds	15,689.1	16,452.5	6,307.0
Federal grants	25,611.0	28,407.9	14,487.0

Department of Transportation. The Department of Transportation (DOT) is responsible for functions relating to providing a safe and efficient transportation system. Program operations of the DOT relate principally to vehicular traffic and the roadway network. In addition, the DOT has important responsibilities in the areas of mass transit, transportation planning and research.

The Fiscal Year 1979 appropriated budget request is for 1,030 operating positions and $32,061,600. Non-appropriated Federal grants which support operations of this agency total $15,608,200. Most of this funding ($14,487,000) is provided through the Federal Highway Construction Aid Program. Additionally, Federal reimbursements in the amount of $1,873,000 are estimated.

Within this request, funding is provided to maintain ongoing programs, including maintenance of City bridges, streets, and sidewalks. Operation of traffic control and several citywide communications systems is provided for at current levels. The DOT programs in testing and licensing of vehicles, vehicular parking, maintenance of a bicycle network, and streetlighting are also funded in this request.

This request contains recommendations for internal shifts of budget authority (redirections) totalling approximately $1.5 million. This includes consolidation of similar functions, program reductions and discontinuance of low priority programs. A large portion of redirected funds is proposed to be used for replacing deteriorated equipment.

The principal components of the proposed DOT Fiscal Year 1979 capital program, totalling $6,307,000, are bridge replacement and rehabilitation in the amount of $3,232,000 and local street improvements and extensions in the amount of $1,850,000.

This budget request includes establishment of a comprehensive program to improve parking and traffic enforcement in the City. This new program entails a civilian force to write traffic tickets; increase vehicular towing and impounding to clear traffic lanes; increased booting of vehicles belonging to violators who habitually refuse to pay tickets; and adjudicating parking and minor traffic violations through administrative hearings.

Implementation of this program will greatly reduce the number of illegally parked vehicles in residential and business areas, improve traffic flow and enhance safety of motorists and pedestrians. Also, administrative hearings will greatly reduce the waiting time and inconvenience for motorists who now have cases heard in overcrowded traffic court sessions.

Funding for this program entails a transfer of 35 positions and available resources in the amount of $439,000 from the Superior Court. An increase of $5,092,800 is requested for this program in Fiscal Year 1979 to provide resources to fill 146 transferred and/or redirected unfunded positions and meet other operating costs. This program will generate additional revenue amounting to approximately $20,000,000.

Washington Metropolitan Area Transit Commission. The Transit Commission has jurisdiction over the regulation of certain privately-owned transportation functions within the area defined by statute. This jurisdiction includes operating authority, routes, rates and protection of the public. The transit district includes the cities of Washington, Alexandria and Falls Church and neighboring counties.

The Transit Commission's total budget is shared between jurisdictions of the transit district. The jurisdiction's shares are determined on the basis of population; the City's population is 26.07% of the total and this budget request of $72,300 represents that pro rata share of the total budget. This amount represents a small reduction over the Fiscal Year 1978 budget estimate.

School Transit Subsidy. The funds requested are for payment to the Washington Metropolitan Area Transit Authority for transporting school children at a reduced fare. School children are authorized by law to use common carrier service (Metrobus) at a reduced rate of ten cents for each trip in traveling to and from school. The difference between the adult fare and the reduced rate is borne by the City and results in this subsidy requirement. The amount requested for Fiscal Year 1979 is $4,385,000, an increase of $85,000 over the Fiscal Year 1978 estimate.

Washington Metropolitan Area Transit Authority (WMATA). The WMATA is a metropolitan area organization which is governed by a board of directors made up of officials of the participating jurisdictions. Its function is to provide effective and efficient mass transportation services to citizens and visitors in the metropolitan area.

The District of Columbia budget contains the amount of $41,032,800 for mass transit programs operated by the WMATA. This amount is the City's pro rata share of the expenses of mass transit operations and debt service costs. The other participating jurisdictions also provide financial support for the mass transit program through their individual budgets. The City's budget request is a net requirement which is derived after Federal grant credits are applied on a jurisdiction by jurisdiction basis.

This funding request is broken into three major components. They are: Metrobus operations, Metrorail operations and Metrorail debt service. The amount required for the District's share of bus operations is $20,763,400, which includes $100,000 for the "Downtowner" bus service costs and $1,263,400 for Fiscal Year 1977 bus subsidy requirements. The bus subsidy requirement represents an increase of $2,783,700 over the Fiscal Year 1978 estimate. The District's share of the expenses of Metrorail operations is estimated to be $16,300,000, an increase of $5,400,000 over the 1978 estimate. The District's share includes $3,969,400 for Metrorail debt service (bond interest payments).

The total funding request of $41,032,800 represents an increase of $9,383,500 over the Fiscal Year 1978 estimate. The City's share of mass transit costs continues to be one of the fastest growing programs of the budget.

ENVIRONMENTAL SERVICES

Environmental Services (Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Operating Expenses:			
Department of Environmental Services	63,031.1	66,152.6	66,971.3
D. C. funds	58,474.2	62,164.9	63,331.5
Federal grants	1,612.1	1,415.3	1,322.4
Other grants and non-D.C. reimbursements	2,944.8	2,572.4	2,317.4
Washington Aqueduct	8,904.7	9,288.2	10,168.4
D. C. funds	8,719.3	9,104.2	9,978.4
Other grants and non-D.C. reimbursements	185.4	184.0	190.0
TOTAL	71,935.8	75,440.8	77,139.7
D. C. funds	67,193.5	71,269.1	73,309.
Federal grants	1,612.1	1,415.3	1,322.4
Other grants and non-D.C. reimbursements	3,130.2	2,756.4	2,507.4
Capital Funds			
Department of Environmental Services	28,374.0	27,608.0	27,503.2
D. C. funds	7,166.0	6,400.0	12,003.2
Federal grants and non-D.C. reimbursements	21,208.0	21,208.0	15,500.0
Washington Aqueduct	40.0	1,790.0	30,740.0
D. C. funds	40.0	1,790.0	30,740.0
TOTAL	28,414.0	29,389.0	58,243.2
D. C. funds	7,206.0	8,190.0	42,743.2
Federal grants and non-D.C. reimbursements	21,208.0	21,208.0	15,500.0

Department of Environmental Services. The Department of Environmental Services forms the major portion of the City's structure for control of environmental pollution and community health hazards.

The Fiscal Year 1979 appropriated budget request for operating programs is 2,738 positions and $63,331,500. Non-appropriated funds which support operating programs for this agency include $1,322,400 in Federal grants and $2,317,400 in Federal and other reimbursements to the District.

Within this request, funding is provided for overall personnel and inflationary expenses and to continue departmental programs of Solid Waste Management, Water Resources Management and Environmental Health.

The Solid Waste Management Administration is responsible for the collection of residential waste from buildings with three or less dwelling units, the cleaning of the City's streets and alleys, and the disposal of all solid waste generated in the City. Collection of household refuse will continue twice weekly in Fiscal Year 1979 with special collections of bulky waste, and collection routes will conform to Ward boundaries on a continuous path basis. In-City disposal facilities will include the new Fort Totten transfer station which became operational in September of Fiscal Year 1977. This budget provides for the establishment of a Bureau of Street and Alley Cleaning independent of the Collection Bureau to give this function equal priority and status. Emphasis will continue to be toward mechanical sweeping through control of parking. In Fiscal Year 1979, 180,000 tons of houshold refuse will be collected by the Department, and 556,000 tons will be disposed at the Lorton landfill directly and through

City transfer stations. The solid Waste Management budget for Fiscal Year 1979 is 1,191 positions and $22,279,600.

The Water Resources Management Administration is responsible for the maintenance and operation of the City's water distribution system, sanitary sewage and storm water systems and the regional D.C. Waste Water Treatment Plant at Blue Plains. These services are furnished under Federal and D.C. regulations and controls delineated in regional agreements. Funding increases will provide for the maintenance and operation of a sanitary and combined sewer metering program. This program will more accurately determine sewage flows from suburban jurisdictions and thus, more accurately determine D.C. sanitary and combined sewage flows. The program will provide more accurate data to support the approximately $11 million in revenue from user jurisdictions—Maryland and Virginia. Additional increases are also provided for recently expanded operations at the Waste Water Treatment Plant and maintenance of the new facilities at the plant. D.C. revenues finance approximately 50% of the cost of operating the regional plant. Maryland, Virginia and the Federal government finance the remaining cost. Composting of sludge generated at the treatment plant will begin late in Fiscal Year 1978. This program is made possible by an EPA construction grant. Substantial savings in sludge disposal resulting from this process will finance a large portion of increased personnel and inflationary costs in Fiscal Year 1979 in Water Resources Management. The Water Resources Management budget in Fiscal Year 1979 is 1,030 positions and $31,893,100.

The Environmental Health Administration provides services that are designed to prevent and/or control environmental health hazards and stresses to citizens and visitors to the District of Columbia. Emphasis will continue in Fiscal Year 1979 on monitoring more stringent air and water standards, stricter food vendor operations, certification of food service supervisors, and pest control operators, as well as tougher solid waste control regulations, asbestos measurements and urban noise control. Loss of Federal grant funds in the above areas will be somewhat offset in Fiscal Year 1979 by labor and cost-saving improvements. The Environmental Health Administration budget for Fiscal Year 1979 is 106 positions and $2,039,500.

Significant program shifts affecting this agency include a transfer of funds to the Department of Transportation to fund paving cuts on private water connections. Major redirections of available funds within the Department are proposed to: fund required personnel cost adjustments throughout the Department; place the Budget and Finance and Revenue Divisions organizationally under the Office of the Director; establish the Bureau of Street and Alley Cleaning separate from Solid Waste Collection; provide increased maintenance and staffing at the Waste Water Treatment Plant; and begin the sewage flow metering program.

In addition, $12,003,200 is requested for capital improvements for water conservation and sewer improvements and rehabilitation resulting in additional sewage capacity for the District and modifications at the Solid Waste Reduction Center. I-95 (landfill) site development at Lorton, Virginia, updated air quality equipment, and magnetic separation of metals at the Solid Waste Reduction Center are also budgeted.

Funding for new programs and activities totals $1,-895,500. This increase includes $123,800 for a proposed soil erosion and sedimentation program; $70,600 for sewage flow metering; $513,100 for staffing and maintenance for the new solids processing facilities at the Blue Plains treatment plant; $1,006,700 for staffing, maintenance and operating costs of new nitrification and multi-media facilities at the treatment plant; $44,500 for operation of the new Fort Totten solid waste transfer station; $83,200 to fund implementation of the Noise Control Act of 1977, which provides for regulation of noise levels in the District; and $53,600 for the Pesticide program which will certify and monitor pest control operators.

Washington Aqueduct

The Washington Aqueduct Division of the U.S. Army Engineer District, Baltimore, provides the water supply for over 1.2 million residents of the District of Columbia, Northern Virginia and to the Federal government.

The Fiscal Year 1979 appropriated budget request for operating programs is 310 positions and $9,978,400. Non-appropriated funds which support operating programs for the agency include $190,000 in non-District reimbursements.

Included in this request is funding provided for overall personnel and inflationary increases and to permit the agency to maintain the mission of collecting, purifying and pumping an adequate supply of potable water to the user jurisdictions. Over 73.5 billion gallons of purified water were pumped to these consumers in Fiscal Year 1977. Water distribution in the user jurisdictions is the responsibility of the local governments.

In addition, $30,740,000 is requested for capital improvements to improve the City's water supply by replacement of the 72 year old water plant at the McMillan reservoir. Also, as a step in the cleanup of the Potomac River, washwater and basin sludge removal at Dalecarlia and Georgetown reservoirs is provided.

Funding for new programs and activities totals $874,200. This increase provides basically for continuing increases in the cost of electricity. The balance includes personal service and overhead adjustments.

PERSONAL SERVICES

Personal Services (Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Operating Expenses:			
Personal Services	—	$ 34,949.7	$ 69,300.0
D.C. funds	—	34,949.7	69,300.0

Program Description—This appropriation contains estimates of budget authority required for annual cost-of-living salary increases. It does not include within grade increases or merit promotions which are awarded to individual employees. The estimates are presented here as a separate appropriation title primarily because of the timing of the rate setting for salary increases in relation to the regular annual budget formulation process. The rate for the annual cost-of-living increase is set more than a year after the City's annual budget formulation process begins. Therefore, anticipated requirements are shown here in one appropriation for all agencies as opposed to adjusting agency allotments prior to approval of increases rates. However, these estimates are formulated using agency level and pay plan data and are further analyzed be comparison with actual employment levels before final distributions are made to agencies.

Annual Salary Increase Amounts—The FY 1979 budget request for Personal Services contains an estimated 54 percent salary increase to be effective in October 1978. This requirement in the amount of $37,196,000 and the October 1977 amount of $32,104,000 are the components of the FY 1979 request for Personal Services.

The request assumes that all employees of the City would receive the same cost-of-living increase granted to Federal general schedule employees and that increase will be about five percent. This rate would apply to all employees except the wage grade employees where the increase is determined by a different standard and is usually a higher rate. In addition to the general schedule employees, those included in this proposal are teachers, higher education personnel, policemen and firemen.

Fiscal Year 1978—The funding request for FY 1978 was also based on the assumption that all City employees would receive equivalent Federal rates. The City's estimate was determined in December 1976, and estimated to be five percent. The actual rate, approved in September 1977, was in excess of seven percent. The additional funding over the approved available funds will be met through budget control measurements and/or other steps necessary to meet requirements.

SETTLEMENT OF CLAIMS AND SUITS

Settlement of Claims and Suits (Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Operating Funds:			
Settlement of Claims and Suits	$ 234.1	—	—
D. C. funds	234.1	—	—

Settlement of Claims and Suits

The Settlement of Claims and Suits appropriation provides for property damage claims in excess of $1,500 and of personal injury claims in excess of $5,000, approved by the Mayor in accordance with the provisions of the Act of February 11, 1929, as amended (45 Stat. 1160; 46 Stat. 500; 65 Stat. 131).

REPAYMENT OF LOANS AND INTEREST

Repayment of Loans and Interest (Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Operating Expenses:			
Repayment of Loans and Interest	$ 80,838.7	$ 116,968.5	$ 111,700.0
D. C. funds	80,838.7	116,968.5	111,700.0

Repayment of Loans and Interest

The amount requested for Fiscal Year 1979 to make payments of principal and interest on loans to finance the District's capital improvements program and to meet short-term cash requirements for operating programs is $111,700,000. Of the amount requested, $22,358,600 is for principal payments and $89,341,400 is for interest payments.

Public Law 93-198, dated December 24, 1973, terminated, as of January 2, 1975, the District's permanent authority to borrow from the U.S. Treasury to finance the capital improvements program. The Act authorized the District to issue tax-exempt general obligation bonds to finance capital projects and provided interim loan authority by which the District could borrow from the U.S. Treasury to finance projects for which funding had been authorized or appropriated before January 2, 1975. Because of unanticipated delays in the development of the bond issuance program, the District proposed an amendment to Public Law 93-198 to extend the interim borrowing authority. The amendment was enacted as P.L. 95-131, dated October 13, 1977.

The request for repayment of loans and interest is for the general fund. D.C. Act 1-42, dated January 22, 1976, abolished the highway, water, sanitary sewage works and metropolitan area sanitary sewage works funds. The general fund of the District contains the following revenues: taxes, fees, charges and miscellaneous receipts; Federal payment to the District of Columbia; loans from the U.S. Treasury and other sources; and any monies for operating expenses not otherwise designated to be deposited in another fund of the District of Columbia Government.

The Fiscal Year 1979 request includes $109,638,900 to repay amounts borrowed for construction loans, $861,100 to repay amounts borrowed by the District during Fiscal Year 1978 to meet semiannual interest payments on Stadium bonds, and $1,200,000 to make interest payments on short-term notes issued during Fiscal Year 1979.

An amount of $1,798,200 is included to make principal and interest payments for sanitary sewage works loans previously deferred.

A total of $785,500 in principal and interest payments due October 1, 1978, is being deferred in accordance with Public Law 86-711 and Public Law 86-515, which authorized the District to defer debt service payments for loans for the Potomac Interceptor and related sanitary sewage projects when revenues from charges for treating sewage flowing into the District from the Potomac Interceptor are not sufficient to cover operating and maintenance costs and debt service requirements.

INAUGURAL EXPENSES

Inaugural Expenses (Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Inaugural Expenses	$ 650.0	—	—
D. C. funds	650.0	—	—

Inaugural Expenses

This appropriation provides for expenses incurred in connection with the Presidential Inaugural on January 20, 1977.

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CAPITAL IMPROVEMENTS PROGRAM

Capital Improvements Program	1977 Actual[1]	1978 Estimate	1979 Estimate
Capital Funds:			
D. C. Obligations	$ 547.6	$ 3,893.5	$ 1,247.6
Public Schools	834.0	18,470.5	15,400.0
Public Library	—	1,659.0	—
Recreation Department	—	301.5	—
Metropolitan Police Department	—	—	3,517.2
Fire Department	—	2,308.5	530.0
Department of Human Resources	3,300.0	—	3,275.0
Department of General Services	7,718.0	41,805.0	5,270.0
University of the District of Columbia	—	56,696.4	2,500.0
Department of Transportation	8,733.0	8,099.0	6,307.0
Washington Metropolitan Area Transit Authority (Metro)	6,956.1	8,353.5	—
Department of Environmental Services	7,166.0	6,400.0	12,003.2
Washington Aqueduct	40.0	1,790.0	30,740.0
Municipal Planning Office	—	27,700.0	49,000.0
Sursum Corda Neighborhood Center	1,292.0	—	—
TOTAL	36,586.7	177,476.9	129,790.0
Federal grants, other non-D.C. reimbursements	47,655.9	81,802.3	31,187.0
TOTAL, CAPITAL IMPROVEMENTS PROGRAM	84,242.6	259,279.2	160,977.0

[1] Appropriation

Capital Improvements Program

The proposed Capital Improvements Program for Fiscal Year 1979 includes funding for 36 projects, of which 15 are new. The amount requested is $130 million.

Approximately 38% of the Fiscal Year 1979 budget request, or $49 million, is designated to start construction of the Civic Center. The project which is expected to ultimately cost $109 million is proposed in the Fiscal Year 1978 capital budget for site acquisition and design at an estimated cost of $27 million. The Fiscal Year 1979 request is based on projected obligations for construction during the fiscal year. The balance of funding necessary to complete the Civic Center is projected for Fiscal Year 1980.

In addition to the Civic Center request, the Fiscal Year 1979 Capital Budget includes $28 million to replace the 70 year old Water Treatment Plant at McMillan. Also proposed is $14 million for continuing permanent improvements projects, $7 million to complete projects previously funded, $31 million for new project starts and one reprogramming action to be accomplished from surplus budget authority on a completed capital project.

The new project starts are primarily in the areas of education and environment. The Fiscal Year 1979 Capital Budget proposes modernizations to Eastern Senior High School and Ellington School for the Performing Arts at a total cost of $15 million. To support improved air quality, provide water conservation to increase sewer capacity and to extend the District's landfill useful life, $11 million is proposed for updating air quality at Solid Waste Reduction Center #1 (SWRC), Dueling Branch Relief Sewer, conversion of sewage pumping units, I-95 Site Development, rehabilitation of sanitary sewer systems, process water modifications at SWRC #1, and magnetic separation of metals at SWRC #1. Other new project starts include modernizations and addition to the First District Police Station, permanent improvements at Forest Haven, permanent improvements at D.C. Village, renovations and an addition to the Dog Pound and elimination of fire hazards in the District Building.

The reprogramming action proposed will provide funding for alteration to the M.M. Washington Career Development Center.

The Fiscal Year 1979 Capital Budget continues the District's policy of completing the presently authorized program while holding new project starts to a minimum. Added emphasis continues on maintaining and improving existing facilities rather than initiating new building programs.

The Ongoing Program

The Fiscal Year 1979 request should be viewed in the context of the ongoing Capital Improvements Program for the District of Columbia. Capital projects now under way represent a total cost of $1.6 billion.

The projects in the capital program represent the District Government's commitment to the improvement of the public facilities of the City. The District's Capital Improvements Program has given a high priority to the strengthening of various communities within the City by undertaking $400 million in projects, such as public schools and recreation centers, which directly serve citizens in a given neighborhood. Major projects benefiting the entire City include two new campuses for higher education, correctional institutions, the water pollution control plant at Blue Plains, the Metro mass transit system, and the Civic Center which is projected to return a fiscal profit to the City.

The active projects in the $300 million D.C. Public Schools building program will replace or modernize many of the City's deteriorated and overcrowded school facilities. The major portion of this program, initiated in Fiscal Year 1969, included the following projects:

NEW ELEMENTARY SCHOOLS: Fletcher-Johnson (W7), Winston (W7), Wilkinson (W8), Washington-Highlands (W8), Fort Lincoln (W5), Terrell (W8), Oxon Run (W8), Malcolm X (W8), Shaed (W5), and Mamie D. Lee (W5).

ELEMENTARY SCHOOL REPLACEMENTS: Takoma (W4), Brookland (W5), Benning (W7), Burrville (W7), Merritt (W7), Congress Heights (W8), Orr (W8), Perry-Simmons (W2), Bruce-Monroe (W1), Morgan (W1), Gage-Eckington (W1), and West (W4).

ELEMENTARY SCHOOL MODERNIZATIONS OR ADDITIONS: Langdon (W5), Thomas (W7), Young (W5), J.O. Wilson (W6), Montgomery (W2), Walker-Jones (W2), Bancroft (W1), Eaton (W3), Lafayette (W3), Bowen (W2), Amidon (W2), Webb (W5), Ketchum (W6), Payne (W6), Wilson (W6), Carver (W7), Randle (W7), Birney (W8), and Moten (W8).

JUNIOR HIGH SCHOOLS: Shaw Junior High School Replacement (W2), new Fletcher-Johnson (W7), and Oxon Run (W8).

SENIOR HIGH SCHOOLS: New Woodson Senior High School (W7), Dunbar Senior High School (W2), Roosevelt Senior High School Modernization and Addition (W5), M.M. Washington Vocational High School Addition (W5), Phelps Vocational High School Addition (W5), Wilson Senior High School Swimming Pool (W3), Anacostia Senior High School Modernization and Addition (W6) and Penn Center (W5).

The 1979 capital outlay request includes funds for: Eastern Senior High School Modernization (W6); Ellington School for the Performing Arts Modernization (W3); and a reprogramming to provide funds for alterations to M.M. Washington for Health Cluster (W5) as part of the Public Schools Career Development Program.

Higher Education

The District of Columbia Teachers College, the Federal City College and the Washington Technical Institute have been merged to form the University of the District of Columbia. The University's capital program provides for the development of campuses at Connecticut and Van Ness and the Mount Vernon Square Area. The first stage of the Van Ness Campus is completed and in use, and the second stage is under construction. These two stages of permanent campus development at Van Ness will cost $75 million.

Development of the University's Mount Vernon Square Campus is in the design stage. Construction funds in the amount of $56 million are included in the Fiscal Year 1978 Capital Budget. The total cost of this permanent campus development will be $70 million.

The 1979 Capital Budget request includes equipment funds for the second stage of the Van Ness Campus.

Social Services

Health care facilities, recreation centers, and libraries are the major capital projects in the social services area.

The capital program for the D.C. General Hospital provides for renovation and air-conditioning of the hospital. Also included is an addition to replace the outdated OB Building.

The capital improvements program for the Department of Human Resources covers a variety of improvements to the various institutions operated by the department. Projects representing more than $50 million in District funds are under way or proposed, including a new facility for the D.C. Medical Examiner, a psychiatric treatment center, renovations of food service facilities and construction of a therapy building at Forest Haven, Maryland, a new health center (Area B), and improvements to D.C. Village, the City's residential care facility for the aged.

Permanent improvements at Forest Haven, permanent improvements at D.C. Village, renovation and an addition to the Dog Pound, and a reprogramming action to supplement funds for a new Receiving Home for Children are proposed in the Fiscal Year 1979 Capital Budget request.

The City's recreation capital program includes 11 funded projects that are in progress: Wheatley Playground (W5); Parkview Playground (W1); Therapeutic Center for Recreation (W6); Morgan-Happy Hollow Playground (W1).

Douglas Recreation Site Development (W8); Langdon Park East Development (W5); Camp Site Development at Scotland, Maryland; East Potomac Pool Bath House (W2); the Kenilworth-Parkside Recreation Center Development (W7); Lincoln Center (W2); Shapiro Tract Acquisition (W1).

Recreation projects that are in progress will provide the City with $22 million in new facilities. The Fiscal Year 1978 Capital Budget proposed one new project, the Fairfax Recreation Center Ground Development.

The D.C. Public Library system has shifted from a program of kiosk libraries to a limited program of branch libraries. The Deanewood Branch Library was approved in the Fiscal Year 1976 Capital Budget. The Fiscal Year 1978 Budget proposed funds for the construction of the Lamond-Riggs Branch Library.

Transportation

The goal of the District Government is to develop an improved transportation system for the City and to take part in regional efforts to meet transportation needs.

The construction of the METRO Rapid Rail Transit System is the most extensive project in the City's Capital Improvements Program. The District's authorized share of $269.7 million was reached in Fiscal Year 1978. If additional funding is necessary for Fiscal 1979, new legislative authority must be approved to raise the limit on the District's share. A budget amendment or a supplemental request will be proposed following a decision to proceed with new legislative authority.

In addition to the METRO rail contributions, the City has contributed $32 million to the cost of acquiring and improving the four area bus companies which were purchased by the Washington Metropolitan Area Transit Authority in early calendar year 1973. Additional funds may be needed to improve the regional bus system. Funding for Fiscal Year 1979 will be proposed as a budget amendment or as a supplemental request following WMATA Board action on its proposed Fiscal Year 1979 budget.

The District is also carrying out a highway capital program with current projects totalling more than $190 million in District funds. This program includes the connection of Eastern Avenue between far Northeast and near Northeast, a traffic operations control center and community street improvements.

Projects proposed for Fiscal Year 1979 provide for rehabilitation of Chain Bridge and Benning Road Bridge across Kenilworth Avenue, local street improvements, traffic operations improvements, resurfacing Federal-Aid streets, safety improvements, bicycle network and Southern Avenue.

Environmental Services

The District will contribute $60 million toward the total $360 million cost of the water pollution control plant at Blue Plains. When completed, the improved facility will eliminate 90 percent of all pollutants from processed sewage waste material. Water conservation and sewer improvements resulting in additional sewage capacity for the District and an improved environment for economic development are projected upon completion of Fiscal Year 1979 proposals for the Dueling Branch Relief Sewer, Process Water Modifications at the Solid Waste Reduction Center #1, rehabilitation of sanitary sewer systems and conversion of sewage pumping units.

Other projects proposed for Fiscal Year 1979 include the I-95 Site Development at Lorton, Virginia, update air quality equipment at SWRC #1, magnetic separation of metals at SWRC #1 and permanent improvements for water and sewer systems.

The City's water supply system will be improved by the Replacement of the Water Plant at McMillan, which is proposed in the Fiscal Year 1979 Capital Budget. The new plant, at a cost of $36 million, will replace the outdated McMillan Plant which is now 70 years old.

Washwater and basin sludge removal at Dalecarlia and the Georgetown Reservoirs is requested for Fiscal Year 1979 as a first step toward the clean-up of the Potomac River.

Public Safety

The Public Safety capital program encompasses the construction of new Police District Station Houses, replacement of obsolete firefighting facilities, replacement or modernization of correctional institutions, and the construction of a new court facility.

The Metropolitan Police Department's District Headquarters program will enable the Department to centralize operations in seven Police District Station Houses. This $21 million program includes: the construction of four new District station houses, an addition to one District station house, and the renovation of a building for use as a District station house. The modernization and addition to the first District station is proposed for Fiscal Year 1979.

The Fire Department's capital program includes the replacement of five obsolete fire stations (#2, #4, #6, #11, #12) with modern facilities, and the initiation of a voice alarm system to replace current fire alarm boxes.

The City has recently completed a 960 inmate capacity, $30 million Detention Center. Federal funds have been approved to expand this facility to a 1,400 inmate capacity.

A new $40 million court facility is under construction.

A High Intensity Lighting Program has been carried out since Fiscal Year 1970. This $4 million provides for improved lighting in high crime areas of the District.

Economic Development

The Washington Civic Center proposed by the Municipal Planning Office is the City's major new project. The Civic Center, at a cost of $109 million, is the largest project undertaken by the District Government. The Civic Center is expected to generate economic activity that will provide 3,000 to 4,000 new jobs in the City and a new source of income to strengthen the City's tax base. Based on consultant's estimates the projection is expected to spur new development in the downtown area and result in new taxes to the City of $12–16 million annually.

The Fiscal 1978 Capital Budget included $27 million for site acquisition and design of the Civic Center. The Fiscal Year 1979 request of $49 million is for initial construction funding.

General Support

Two major new projects were requested in the Fiscal Year 1978 Capital Budget by the Department of General Services. The conversion of the Juvenile Court Building will enable the District to develop needed office space once the New Court Facility is completed. A new Municipal Office Building at a cost of $35 million will enable the District to consolidate operations, improve service delivery and realize long-term savings in leased space costs.

The Fiscal Year 1979 Capital Budget request is for permanent improvements to District-owned facilities and elimination of fire hazards at the District Building.

REVENUE SHARING PROGRAM

Agency	Amount
Department of Finance and Revenue	$ 300.0
Public Library	499.3
Police Department	1,376.4
Fire Department	2,347.0
Department of Corrections	2,140.0
Public Schools	7,664.8
Recreation Department	208.2
Department of Human Resources	6,520.0
Department of Transportation	2,562.3
School Transit Subsidy	3,700.0
Department of Environmental Services	1,500.0
Total	28,818.0

The budget for Fiscal Year 1979 includes $28,818,000 in Federal general revenue sharing money to finance city programs and activities. Under the State and Local Fiscal Assistance Act of 1972, as amended, which set up the general revenue sharing program, the District of Columbia qualifies for both local and state funds. The District's revenue sharing allocation was based on a formula that took into account general tax effort, income tax collections, population, and per capita income.

The general revenue sharing funds go through the regular appropriations process for the District, with full review by the Council of the District of Columbia and the U. S. Congress.

The specific programs and activities to be funded are described below:

Department of Finance and Revenue—$300,000 to promote and maintain integrity of self-assessed and ad valorem taxes through increased emphases on tax compliance and enforcement and maintenance of annual real estate assessment.

Public Library ($499,300)—$120,000 to support the library book fund and $379,300 to help fund the cost of utilities.

Metropolitan Police Department—$1,376,400 to fund patrol officers and to support the crime prevention and detection activities of the Patrol Division.

Special Trust Fund Deposits

Fire Department—$2,347,000 to support firefighting operations; the amount provided is approximately the sum needed to maintain four firefighting companies.

Department of Corrections—$2,140,000 to provide payments to the Federal Bureau of Prisons for District offenders maintained in Federal correctional facilities.

Public Schools—$7,664,800 to assist in financing the retirement fund for D. C. school teachers.

Recreation Department ($208,200)—$21,600 to provide staffing and maintenance for senior citizens centers located in public housing facilities.

$118,500 to provide staff positions and operational costs for Scotland, Maryland campsite.

$47,900 to help support the cost of chemicals to keep the City's public swimming pools clean and disinfected.

$20,200 to fund cost of utilities for recreation facilities.

Department of Human Resources ($6,520,000)—$3,000,000 to help finance non-reimbursable foster care services in support of the City's welfare reform program.

$3,520,000 to fund the District's General Public Assistance Program which is fully financed by local money and which provides emergency assistance for families and individuals who do not qualify for Federal assistance programs.

Department of Transportation—$2,562,300 to support the street lighting program.

School Transit Program—$3,700,000 to subsidize the transportation of District school children to and from school; the subsidy represents the difference between the 10-cent fare paid by school children and the regular adult fare.

Department of Environmental Services ($1,500,000)—$500,000 for transport and compactor vehicles used in the solid waste collection and disposal program.

$1,000,000 to help fund purchase of supplies and materials for street cleaning and the solid waste collection and disposal program.

MISCELLANEOUS MUNICIPAL FUNDS

Advisory Neighborhood Commissions, Security Fund

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	.1	1.1	2.2
Estimated receipts	1.0	1.1	1.2
Total Revenue Available	1.1	2.2	3.4
Estimated disbursements	—	—	—
Closing balance	1.1	2.2	3.4
Outlays	−1.0	−1.1	−1.2

This bond fund for treasurers is paid for by a small ($30.00) annual contribution by each participating ANC. To date, all but one ANC, which has used private bonding, are members. There has been no need for disbursements from the fund to date. The fund is held at interest in Independence Federal Savings and Loan Association. Section 16 of the Advisory Neighborhood Commissions Act of 1975 (D.C. Law 1-21), as added by D. C. Law 1-58, sec. 2, March 26, 1976 (22 DCR 5454; D. C. Code, sec. 1-171 1) requires that all ANC treasurers be bonded.

Alcoholic Rehabilitation Program

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	−$4.2	−$23.5	—
Estimated receipts	71.6	72.3	73.0
Total Revenue Available	67.4	48.8	73.0
Estimated disbursements	90.9	48.8	73.0
Closing balance	−23.5	—	—
Outlays	19.3	23.5	—

This fund is derived by a 6% deduction from the license fees for the manufacture or sale of alcoholic beverages, except for retailers' license, class E, imposed by section 11 of the District of Columbia Alcoholic Beverage Control Act, as amended (Title 25-111a, D. C. Code). This fund is used to establish and maintain a program for the rehabilitation of alcoholics, promote temperance, and provide for the medical and scientific treatment of persons found to be alcoholics by the courts of the District of Columbia.

Correctional Industries Fund

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$529.0	$479.0	$457.0
Estimated receipts	2,094.0	2,230.0	2,085.0
Total Revenue Available	2,623.0	2,709.0	2,542.0
Estimated disbursements	2,144.0	2,252.0	2,026.0
Closing balance	479.0	457.0	516.0
Outlays	50.0	22.0	−59.0

This fund is used for performance of services and production of commodities that will contribute to the knowledge and skill in trades and occupations of residents. Products and services produced by the fund are sold to other government agencies and proceeds are credited to the fund. The fund is used for all necessary expenses related to the operation including materials, equipment, personal services and payments to residents. At the end of each fiscal year, the Director submits financial reports to the Mayor for disposition of any realized profits. (Public Law 88-622, October 8, 1964 (78 Stat. 1000; D. C. Code, Sec. 24-451 Et. Seq.))

Operating Fund, Robert F. Kennedy Memorial Stadium

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	329.0	603.0	553.0
Estimated receipts	1,310.5	1,350.0	1,500.0
Total Revenue Available	1,639.5	1,953.0	2,053.0
Estimated disbursements	1,036.5	1,400.0	1,600.0
Closing balance	603.0	553.0	453.0
Outlays	−274.0	50.0	100.0

This fund is used to provide for the maintenance and operation of the Robert F. Kennedy Memorial Stadium by the D. C. Armory Board. Deposits are received from parking concessions, franchises, and box office receipts.

Construction Services

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$10,039.0	$9,069.6	$16,369.6
Estimated receipts	4,916.0	12,800.0	7,200.0
Total Revenue Available	14,955.0	21,869.6	23,569.6
Estimated disbursements	5,885.4	5,500.0	5,300.0
Closing balance	9,069.6	16,369.6	18,269.6
Outlays	969.4	−7,300.0	−1,900.0

This fund, which consists primarily of advances from the capital outlay appropriation for public building construction, is used to provide design, inspection, and administration of contracted construction of public buildings by contract or by Department of General Services professional staff.

Printing and Reproduction, Working Fund

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	−$274.8	−$287.0	−$286.9
Estimated receipts	2,282.8	2,535.0	2,550.0
Total Revenue Available	2,008.0	2,248.0	2,263.1
Estimated disbursements	2,295.0	2,534.9	2,535.0
Closing balance	−287.0	−286.9	−271.9
Outlays	12.2	−.1	−15.0

This fund consists of reimbursements received for the Printing and Reproduction Branch of the Bureau of Material Management which performs or procures the performance of all printing, central duplicating, and photocopy services for the District of Columbia Government (69 Stat. 263).

Publications Fund

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$158.3	$160.9	$163.5
Estimated receipts	22.6	22.6	22.6
Total Revenue Available	180.9	183.5	186.1
Estimated disbursements	20.0	20.0	20.0
Closing balance	160.9	163.5	166.1
Outlays	−2.6	−2.6	−2.6

This fund is derived from the sale of maps, regulations, and parts of regulations issued by an agency of the City government at prices approximate to the cost thereof, including the cost of distribution. The fund is used to help defray the expenses of such publication (Act of December 20, 1944 (58 Stat. 819, as amended by Public Law 85-491, July 2, 1958 (72 Stat. 292; D. C. Code, sec. 1-244(i)).

Public Schools Food Service Fund

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$6,731.1	$6,031.0	$5,031.0
Estimated receipts	11,300.0	11,500.0	11,400.0
Total Revenue Available	18,031.1	17,531.0	16,431.0
Estimated disbursements	12,000.0	12,500.0	12,000.0
Closing balance	6,031.1	5,031.0	4,431.0
Outlays	700.1	1,000.0	600.0

The City's schools serve lunches and other food which are available to all secondary level school children and are being made available to all elementary school children through scheduled alteration of facilities. Receipts are derived from payments by students and school personnel and from reimbursements by the Department of Agriculture from grants for the National School Lunch and Special Milk Programs for children. Donated commodities also are received from the Department of Agriculture. Other Federal education grant funds (Impact Aid and Elementary and Secondary Education) are used to provide specific programs. Salaries of employees in the Food Services programs are paid from regular District funds as a result of a legislative change in the District of Columbia Public Schools Food Services Act (Public Law 90-640, approved October 25, 1968).

MISCELLANEOUS MUNICIPAL FUNDS

Repairs and Improvements Working Fund

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$3,700.2	$6,771.6	$2,607.6
Estimated receipts	12,918.5	8,125.0	15,983.5
Total Revenue Available	16,618.7	14,896.6	18,591.1
Estimated disbursements	9,847.1	12,289.0	15,336.7
Closing balance	6,771.6	2,607.6	3,254.4
Outlays	−3,071.4	4,164.0	−646.8

This fund consists of advanced payments and reimbursements received by the Department of General Services for the costs of repairs, improvements, and alterations to District of Columbia buildings and grounds performed by employees of the building trades category such as plumbers, carpenters, steamfitters, electricians, and sheet metal workers. The working fund was established by the Act of July 1, 1954, as amended (68 Stat. 393; D. C. Code Sec. 9-501).

Working Capital Fund, Armory Board

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$59.2	$21.4	$36.4
Estimated receipts	124.3	150.0	150.0
Total Revenue Available	183.5	171.4	186.4
Estimated disbursements	162.1	135.0	135.0
Closing balance	21.4	36.4	51.4
Outlays	37.8	−15.0	−15.0

This fund is derived from receipts deposited to the credit of District of Columbia Armory Board for the rental or leasing of all or any parts of the National Guard Armory not set aside for the exclusive use of the District of Columbia National Guard. The funds are used for the maintenance of the armory (62 Stat. 339).

Working Capital Fund, Educational Agency for Surplus Property

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$19.9	$23.0	$26.4
Estimated receipts	64.4	65.9	80.0
Total Revenue Available	84.3	88.9	106.4
Estimated disbursements	61.3	62.5	76.2
Closing balance	23.0	26.4	30.2
Outlays	−3.1	−3.4	−3.8

The Federal Property and Administrative Services Act of 1949, as amended, authorizes the disposal of surplus Federal property to public and private educational, health, and research institutions. This program is managed in the District by the City's Department of General Services, Bureau of Materiel Management, which collects charges from benefiting institutions to cover the cost of interim storages and distribution. Established by Act of August 16, 1950 (64 Stat. 450; D. C. Code, Sec. 31-1302).

Property Redemption Fund

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$15.0	$43.5	$45.5
Estimated receipts	504.6	496.0	496.0
Total Revenue Available	519.6	539.5	541.5
Estimated disbursements	476.1	494.0	496.0
Closing balance	43.5	45.5	45.5
Outlays	−28.5	−2.0	—

Payments made by persons redeeming property previously sold for taxes are used to repay persons holding certificates representing purchases of unpaid taxes on property (20 Stat. 101, 108, sec. 1–15; 33 Stat. 635, sec. 4).

Surplus Fund, Realty Tax Sales

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$15.0	$77.0	$87.0
Estimated receipts	164.0	165.0	165.0
Total Revenue Available	179.0	242.0	252.0
Estimated disbursements	102.0	155.0	165.0
Closing balance	77.0	87.0	87.0
Outlays	−62.0	−10.0	—

This fund is derived from the surplus of receipts from the tax sales over the amount due for taxes and special assessments. Payments are made to former owners of the property sold, or to the holders of certificates of sale if the property is redeemed (32 Stat. 621, 635).

Security Brokers Fund

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$76.6	$19.6	$5.0
Estimated receipts	50.0	50.0	100.0
Total Revenue Available	126.6	69.6	105.0
Estimated disbursements	107.0	64.6	100.0
Closing balance	19.6	5.0	5.0
Outlays	57.0	14.6	—

This fund is derived from fees and collections from security broker-dealers or agents. Expenditures may be made from this fund for hearings held in connection with licensing to such persons (78 Stat. 632).

Welfare Fund, Department of Corrections

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	—	$28.3	$58.0
Estimated receipts	666.3	699.6	734.6
Total Revenue Available	666.3	727.9	792.6
Estimated disbursements	638.0	669.9	703.4
Closing balance	28.3	58.0	89.2
Outlays	−28.3	−29.7	−31.2

Receipts from the operations of canteens in the several institutions of the Department of Corrections are deposited to this fund. Profits from the operations are applied to recreational and welfare purposes for the benefit of the prisoners.

Inmates' Funds, Department of Corrections

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$119.9	$118.3	$119.2
Estimated receipts	1,147.3	1,152.3	1,160.0
Total Revenue Available	1,267.2	1,270.6	1,279.2
Estimated disbursements	1,148.9	1,151.4	1,157.0
Closing balance	118.3	119.2	122.2
Outlays	1.6	−.9	−3.0

Personal funds of inmates at the Central Facility, Maximum Security, Youth Centers #1 and #2, Minimum Security Facility, Detention Center, and Jail Annex together with earnings of residents in industrial enterprises of the Department of Corrections are deposited to this fund for subsequent refund to inmates (Act of June 27, 1946 (60 Stat. 320, D. C. Code, Sec. 24-442).

Fees and Other Collections, Recreation Department

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$181.0	$152.1	$122.1
Estimated receipts	334.7	330.0	300.0
Total Revenue Available	515.7	482.1	422.1
Estimated disbursements	363.6	360.0	320.0
Closing balance	152.1	122.1	102.1
Outlays	28.9	30.0	20.0

Fees and receipts from recreation activities are available to defray the cost of conducting Recreation Department programs and activities (Act of April 29, 1942 (56 Stat. 263; D. C. Code, Sec. 8-211).

Student Loan Program

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$172.0	$560.8	$355.7
Estimated receipts	557.0	609.1	1,498.0
Total Revenue Available	729.0	1,169.9	1,853.7
Estimated disbursements	168.2	814.2	1,066.6
Closing balance	560.8	355.7	787.1
Outlays	−388.8	205.1	−431.4

To assist students in obtaining loans for their scholastic studies as either a graduate or undergraduate student. Eighty percent (80%) Federal reimbursement on defaulted loans is deposited to this account as well as an amount transferred annually from appropriated funds which represents 5% of loans outstanding. The statutory basis is the Higher Education Act of 1965 (20 U.S.C. 1086).

Motor Vehicle Financial Responsibility Fund

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$308.5	$227.3	$129.3
Estimated receipts	17.7	12.0	10.0
Total Revenue Available	326.2	239.3	139.3
Estimated disbursements	98.9	110.0	60.0
Closing balance	227.3	129.3	79.3
Outlays	81.2	98.0	50.0

Deposits are made by persons involved in motor vehicle accidents to assure a source of compensation for persons injured or property damaged in such accidents as a result of the negligence of uninsured motorists (68 Stat. 120).

Miscellaneous Trust Fund, Operating Accounts Streets

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$277.2	$572.9	$500.0
Estimated receipts	3,458.3	3,500.0	3,675.0
Total Revenue Available	3,735.5	4,072.9	4,175.0
Estimated disbursements	3,162.6	3,572.9	3,675.0
Closing balance	572.9	500.0	500.0
Outlays	−295.7	72.9	—

This fund, authorized by the D. C. Appropriation Act approved April 27, 1904, and Title 7-1238 D. C. Code, was established for the purpose of repairing utility cuts in streets and sidewalks. Receipts are from utility companies, plumbers, etc., for charges made for required repairs.

Maintenance and Repair of Vehicles, Working Fund

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$225.8	$169.8	$25.0
Estimated receipts	1,178.2	1,188.1	1,300.0
Total Revenue Available	1,404.0	1,357.9	1,325.0
Estimated disbursements	1,234.2	1,332.9	1,300.0
Closing balance	169.8	25.0	25.0
Outlays	56.0	144.8	—

This fund consists of advanced payments and reimbursements received by the Department of Transportation for the cost of maintenance and repair of vehicles of the City government (68 Stat. 396).

Judicial Retirement and Survivors Annuity Fund

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	$1,375.0	$1,436.0	$1,625.0
Estimated receipts	118.0	229.0	229.0
Total Revenue Available	1,493.0	1,665.0	1,854.0
Estimated disbursements	57.0	40.0	40.0
Closing balance	1,436.0	1,625.0	1,814.0
Outlays	−61.0	−189.0	−189.0

This fund is used to pay retirement and survivor benefits for judges who have entered on duty since the enactment of the Judges' Retirement Act of 1964 (78 Stat. 1055). The District government also makes annual contributions from current revenues to cover retirement and survivor benefits for judges who entered on duty prior to the 1964 act.

TEACHERS' RETIREMENT ANNUITY FUND

(Thousands)	1977 Actual	1378 Estimate	1979 Estimate
Opening balance	$58,585.0	$59,980.0	$62,000.0
Estimated receipts	30,396.0	34,400.0	36,314.0
Total Revenue Available	88,981.0	94,380.0	98,314.0
Estimated disbursements	29,001.0	32,380.0	36,314.0
Closing balance	59,980.0	62,000.0	62,000.0
Outlays	−1,395.0	−2,020.0	—

The fund is used for payment of teachers' retirement benefits (41 Stat. 387, sec. 1, 2; 44 Stat. 727; 60 Stat. 875, secs. 1, 2, 15, 61 Stat. 750).

Stadium Sinking Fund, Armory Board

(Thousands)	1977 Actual	1978 Estimate	1979 Estimate
Opening balance	—	—	—
Estimated receipts	831.6	831.6	831.6
Total Revenue Available	831.6	831.6	831.6
Estimated disbursements	831.6	831.6	831.6
Closing balance	—	—	—
Outlays	—	—	—

This fund is used to meet annual interest payments of $831,600 on stadium bonds. Deposits in the fund are derived from receipts not required for operating and maintenance expenses of the Robert F. Kennedy Stadium and from deficiency advances by the U. S. Treasury (2 D. C. Code 1727, see Federal funds, Advances to Stadium Sinking Fund).

SALARY GRADES AND RANGES
SALARY TABLES

I. Executive Levels:

Executive Level III			$52,500
Executive Level IV			50,000
Executive Level V			47,500

II. General Schedule:

GS-18			$47,500
GS-17			47,500
GS16	42,423	to	47,500
GS-15	36,171	to	47,025
GS14	30,750	to	39,975
GS-13	26,022	to	33,825
GS-12	21,883	to	28,444
GS-11	18,258	to	23,739
GS-10	16,618	to	21,604
GS-9	15,090	to	19,617
GS-8	13,662	to	17,757
GS-7	12,336	to	16,035
GS-6	11,101	to	14,431
GS-5	9,959	to	12,947
GS-4	8,902	to	11,575
GS-3	7,930	to	10,306
GS-2	7,035	to	9,150
GS-1	6,219	to	8,082

III. District of Columbia Police and Fire Salary Schedule:

In accordance with the District of Columbia Police and Firemen's Salary Act of 1958, as amended, (D.C. Code, Secs. 4-823–4-837), D.C. Emergency Act No. 2-51 (enacted October 13, 1977) established the following salary 'schedules:

Class 11	$47,879	to	50,781
Class 10	41,396	to	46,915
Class 9	34,913	to	42,009
Class 8	29,750	to	34,223
Class 7	25,665	to	29,513
Class 6	23,667	to	27,205
Class 5	21,662	to	25,997
Class 4	18,741	to	23,428
Class 3	17,248	to	22,423
Class 2	15,732	to	21,525
Class 1	13,799	to	19,871

IV. District of Columbia Education Salary Schedules:

Pursuant to the District of Columbia Teachers' Salary Act of 1955, as amended, (D.C. Code, Sec. 31-1501, et seq.), D.C. Emergency Act 2-51 (enacted October 13, 1977) established the following salary schedules:

Class 1A			$55,747[1]
Class 1B			49,009[2]
Class 2A			46,558
Class 2B			44,108
Class 3	33,557	to	39,933
Class 4	29,464	to	35,032
Class 5	27,877	to	34,735
Class 6	24,290	to	32,849
Class 7	24,505	to	30,339
Class 8	22,756	to	28,447
Class 9	22,006	to	27,603
Class 10	21,299	to	26,752
Class 11	20,603	to	25,914
Class 12	19,895	to	25,017
Class 13	18,283	to	24,213
Class 14	13,978	to	23,754
Class 15	11,824	to	24,445

[1] *The rate of compensation for Salary Class 1A is limited to the rate for Level III of the Executive Schedule.*

[2] *The rate of compensation for Salary Classes 1B, 2A and 2B is limited to the rate for Level V of the Executive Schedule.*

V. Administrative and Faculty Salary Schedules:

In accordance with the District of Columbia Public Postsecondary Education Reorganization Act, as amended, (D.C. Code, Sec. 31-1701 et seq.), the Board of Trustees of the University of the District of Columbia established the following administrative and faculty salary schedules, effective October 1, 1977:

Level I A			$52,000
Level I B			43,950
Level II	35,755	to	41,035
Level III	32,385	to	37,645
Level IV	28,725	to	34,425
Level V	25,640	to	31,730
Level VI	24,135	to	29,925
Level VII	21,795	to	27,885
Level VIII	19,815	to	25,310
Level IX	16,605	to	21,225
Level X	15,010	to	19,210
Level XI	13,660	to	17,475
Level XII	12,420	to	15,885
Level XIII	11,200	to	14,350
Level XIV	10,035	to	12,905
Level XV	8,575	to	10,990
Star Professor			32,385
Professor	20,915	to	30,365
Associate Professor	16,700	to	24,170
Assistant Professor	13,570	to	19,690
Instructor	12,245	to	17,165
Assistant Instructor	10,210	to	13,780

VI. Wage Board

1. *Non-Supervisory Grade* (WG)

WG-1	$8,694	to	10,130
WG-2	9,443	to	11,024
WG-3	10,234	to	11,918
WG-4	11,003	to	12,834
WG-5	11,773	to	13,749
WG-6	12,542	to	14,622
WG-7	13,312	to	15,538
WG-8	14,102	to	16,459
WG-9	14,851	to	17,326
WG-10	15,642	to	18,242
WG-11	16,411	to	19,157
WG-12	17,202	to	20,051
WG-13	17,950	to	20,946
WG-14	18,720	to	21,861
WG-15	19,510	to	22,755

2. Leader Grade (WL)

WL-1	9,568	to	11,149
WL-2	10,379	to	12,106
WL-3	11,232	to	13,125
WL-4	12,106	to	14,123
WL-5	12,958	to	15,122
WL-6	13,790	to	16,099
WL-7	14,664	to	17,098
WL-8	15,517	to	18,096
WL-9	16,328	to	19,053
WL-10	17,202	to	20,051
WL-11	18,054	to	21,050
WL-12	18,907	to	22,069
WL-13	19,739	to	23,046
WL-14	20,613	to	24,045
WL-15	21,466	to	25,043

3. Supervisory Grade (WS)

WS-1	13,374	to	15,600
WS-2	14,144	to	16,494
WS-3	14,914	to	17,410
WS-4	15,704	to	18,304
WS-5	16,474	to	19,219
WS-6	17,222	to	20,114
WS-7	18,013	to	21,008
WS-8	18,782	to	21,923
WS-9	19,552	to	22,797
WS-10	20,322	to	23,712
WS-11	20,779	to	24,253
WS-12	21,382	to	24,960
WS-13	22,131	to	25,813
WS-14	23,005	to	26,832
WS-15	24,024	to	28,018
WS-16	25,189	to	29,370
WS-17	26,499	to	30,909
WS-18	27,934	to	32,594
WS-19	29,515	to	34,424

DETAIL OF PERMANENT POSITIONS APPROPRIATED FUNDS

General Operating Expenses

Grades	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
Executive Level III	1	1	1
Executive Level IV	1	1	1
GS-18	3	3	4
GS-17	4	5	5
GS-16	28	26	27
GS-15	71	71	74
GS-14	126	130	122
GS-13	260	248	247
GS-12	228	225	228
GS-11	245	245	262
GS-10	47	46	42
GS-9	360	337	379
GS-8	169	167	162
GS-7	375	362	366
GS-6	193	189	205
GS-5	285	303	335
GS-4	359	331	331
GS-3	133	120	123
GS-2	12	11	9
Ungraded	386	363	352
Total permanent positions	3,286	3,184	3,275
Unfilled positions, end of year	553	106	115
Total permanent employment, end of year	2,733	3,078	3,160

Public Safety

Grade	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-17	3	3	3
GS-16	8	8	8
GS-15	27	27	26
GS-14	41	43	42
GS-13	118	118	104
GS-12	203	202	195
GS-11	374	373	362
GS-10	114	115	108
GS-9	328	328	318
GS-8	807	810	774
GS-7	507	517	452
GS-6	644	636	836
GS-5	330	337	301
GS-4	338	281	222
GS-3	36	37	36
GS-2	2	3	3
Classes established by the District of Columbia Police and Firemen's Salary Act of 1958, as amended, (D.C. Code, secs. 4-823–4-837).			
Class 11	2	2	2
Class 10	8	7	6
Class 9	13	15	16
Class 8	61	59	57
Class 7	104	105	105
Class 6	6	6	6
Class 5	294	276	279
Class 4	665	633	623
Class 3	2	2	2
Class 2	44	44	44
Class 1	4,622	4,389	4,156
Ungraded	348	366	380
Adjusted to reflect positions requested by the Joint Committee on Judicial Administration but not by the District	—	−21	−10
Total	10,049	9,721	9,456
Unfilled positions, end of year	787	164	263
Total permanent employment, end of year	9,262	9,557	9,193

Education

Grades	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-15	9	9	9
GS-14	9	8	8
GS-13	28	21	21
GS-12	55	44	47
GS-11	94	82	85
GS-10	4	4	4
GS-9	92	85	85
GS-8	31	30	31
GS-7	109	99	99
GS-6	325	300	303
GS-5	216	195	198
GS-4	563	483	511
GS-3	52	45	45
GS-2	4	1	2
Ungraded	1,783	1,582	1,597

Classes established by the District of Columbia Teachers' Salary Act of 1955, as amended, (D.C. Code, sec. 31-1501 et seq.).

Grades	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
Class 1A	1	1	1
Class 1B	1	1	1
Class 2A	1	1	1
Class 2B	2	2	2
Class 3	12	11	11
Class 4	1	1	1
Class 5	8	7	7
Class 6	202	200	201
Class 7	41	38	38
Class 8	215	202	208
Class 10	71	56	60
Class 12	2	2	2
Class 13	2	1	2
Class 14	1	1	1
Class 15	6,746	6,586	6,636

Education–cont.

Administrative and faculty levels established in accordance with the District of Columbia Public Education Act (D.C. Code, sec. 31-16 et seq.) and the D.C. Public Postsecondary Education Reorganization Act, as amended, (D.C. Code, sec. 31-1701 et seq.).

Grades	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
Level I	2	2	2
Level II	3	3	4
Level III	9	9	8
Level IV	19	19	19
Level V	18	17	17
Level VI	24	24	24
Level VII	27	27	27
Level VIII	39	39	39
Level IX	57	57	63
Level X	41	39	39
Level XI	34	32	32
Level XII	40	40	40
Level XIII	31	28	28
Level XIV	43	43	43
Level XV	9	9	9
Star Professor	9	9	9
Professor	162	162	171
Associate Professor	202	198	195
Assistant Professor	243	240	239
Instructor	78	76	71
Assistant Instructor	1	1	1
Undetermined reduction	−261	—	—
Authorized positions but unfunded	—	291	30
Total	11,510	11,463	11,327
Unfilled positions, end of year	433	332	158
Total permanent employment, end of year	11,077	11,131	11,169

READEX FICHE

Recreation

Grades	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-16	1	1	1
GS-15	2	3	3
GS-14	6	6	6
GS-13	7	7	7
GS-12	20	21	21
GS-11	31	33	33
GS-10	41	40	41
GS-9	116	121	121
GS-8	131	131	129
GS-7	119	118	119
GS-6	17	17	17
GS-5	33	34	34
GS-4	11	13	13
GS-3	3	3	3
Ungraded	216	216	216
Total permanent positions	754	764*	764
Unfilled positions, end of year	70	42	32
Total permanent employment, end of year	684	722	732

*Includes positions for National Children's Island.

Human Resources

Grades	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-18	3	3	3
GS-17	5	5	5
GS-16	18	19	13
GS-15	177	166	95
GS-14	178	171	143
GS-13	219	203	177
GS-12	435	391	355
GS-11	800	750	648
GS-10	149	142	112
GS-9	1,043	908	683
GS-8	229	210	190
GS-7	765	734	592
GS-6	861	775	586
GS-5	1,547	1,400	936
GS-4	830	734	517
GS-3	296	250	178
GS-2	69	41	34
GS-1	19	12	5
Ungraded	1,674	1,551	915
Total permanent positions	9,317	8,465	6,187
Unfilled positions, end of year	1,994	827	549
Total permanent employment, end of year	7,323	7,638	5,638

Transportation

Grades	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-18	1	1	1
GS-17	—	—	—
GS-16	1	1	1
GS-15	9	9	11
GS-14	31	31	24
GS-13	51	49	30
GS-12	93	92	47
GS-11	122	122	55
GS-10	9	9	8
GS-9	110	110	36
GS-8	25	25	17
GS-7	151	151	67
GS-6	86	82	80
GS-5	98	94	130
GS-4	63	62	41
GS-3	27	27	16
Ungraded	544	526	466
Undetermined reduction	—	−93	—
Total permanent positions	1,421	1,298	1,030
Unfilled positions, end of year	258	159	63
Total permanent employment, end of year	1,163	1,139	967

Environmental Services

Grades	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-17	1	1	1
GS-16	2	2	2
GS-15	10	10	10
GS-14	17	17	17
GS-13	50	51	54
GS-12	61	64	67
GS-11	58	58	58
GS-10	2	2	2
GS-9	67	74	74
GS-8	10	10	9
GS-7	53	49	49
GS-6	43	41	43
GS-5	103	90	97
GS-4	61	60	65
GS-3	22	20	21
GS-2	1	1	—
Ungraded	2,104	2,187	2,169
Total permanent positions	2,665	2,737	2,738
Unfilled positions, end of year	349	128	128
Total permanent employment, end of year	2,316	2,609	2,610

Federal Employees (Washington Aqueduct)

Grade	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-15	—	—	1
GS-14	1	1	—
GS-13	5	5	5
GS-12	7	7	8
GS-11	10	10	6
GS-10	—	—	—
GS-9	5	5	6
GS-8	1	1	1
GS-7	6	6	6
GS-6	5	5	3
GS-5	11	11	10
GS-4	7	7	11
GS-3	5	5	6
Ungraded	247	247	247
Total permanent positions	310	310	310
Unfilled positions, end of year	7	7	7
Total permanent employment, end of year	303	303	303

DETAIL OF PERMANENT POSITIONS
MUNICIPAL FUNDS

Alcoholic Rehabilitation Program

Grade	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-14	1	1	1
GS-12	1	1	1
GS-11	1	1	1
GS-5	2	2	2
GS-4	1	1	1
Total permanent positions	6	6	6
Unfilled positions, end of year	1	—	—
Total permanent employment, end of year	5	6	6

Construction Services

Grade	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-15	1	1	1
GS-14	7	7	7
GS-13	20	20	20
GS-12	41	41	41
GS-11	42	42	42
GS-10	—	—	—
GS-9	14	14	14
GS-8	1	1	1
GS-7	7	7	7
GS-6	7	7	7
GS-5	3	3	3
GS-4	7	7	7
Total permanent positions	150	150	150
Unfilled positions, end of year	32	31	31
Total permanent employment, end of year	118	119	119

Correctional Industries Fund

Grade	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-14	1	1	1
GS-13	1	1	1
GS-12	—	—	—
GS-11	3	3	3
GS-10	1	1	1
GS-9	2	2	2
GS-8	2	2	2
GS-7	2	2	2
GS-5	—	—	—
GS-6	1	1	1
Ungraded	23	23	23
Total permanent positions	36	36	36
Unfilled positions, end of year—	—	—	
Total permanent employment, end of year	36	36	36

Maintenance and Repair of Vehicles, Working Fund

Grade	Actual FY 1977	Estimate FY 1978	Estimate
GS-11	2	2	2
GS-7	1	1	1
GS-4	1	1	1
GS-3	1	1	1
Ungraded	37	37	37
Total permanent positions	42	42	42
Unfilled positions, end of year	—	—	2
Total permanent employment, end of year	42	42	40

Printing, Duplicating, and Photographing, Working Fund

Grade	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-14	1	1	1
GS-12	2	2	2
GS-11	2	2	2
GS-9	1	1	1
GS-7	2	2	2
GS-6	1	1	1
GS-5	7	7	7
GS-4	1	1	1
GS-3	1	1	1
Ungraded	58	58	5
Total permanent positions	76	76	76
Unfilled positions, end of year	18	14	14
Total permanent employment, end of year	58	62	6

Repairs and Improvements, Working Fund

Grade	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-15	1	1	1
GS-14	3	2	2
GS-13	1	2	2
GS-12	7	6	6
GS-11	5	5	5
GS-9	4	4	4
GS-8	—	—	—
GS-7	4	4	4
GS-6	7	7	7
GS-5	3	3	3
GS-4	5	5	5
GS-3	1	1	1
Ungraded	308	310	310
Total permanent positions	349	350	350
Unfilled positions, end of year	39	43	36
Total permanent employment, end of year	310	307	314

Operating Fund, Robert F. Kennedy Memorial Stadium

Grade	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
Ungraded	53	53	53
Total permanent positions	53	53	53
Unfilled positions, end of year	—	—	—
Total permanent employment, end of year	53	53	53

Working Capital Fund, Armory Board

Grade	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
Ungraded	10	10	10
Total permanent positions	10	10	10
Unfilled positions, end of year	—	—	—
Total permanent employment, end of year	10	10	10

Working Capital Fund, Educational Agency For Surplus Property

Grade	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-9	1	1	1
GS-7	1	1	1
Ungraded	3	3	3
Total permanent positions	5	5	5
Unfilled positions, end of year	2	2	1
Total permanent employment, end of year	3	3	4

Miscellaneous Trust Fund, Operating Account Streets

Grade	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-13	1	1	1
GS-12	1	1	2
GS-11	1	1	—
GS-9	2	2	2
GS-8	5	5	5
GS-7	14	14	14
GS-6	5	5	5
GS-5	13	13	13
GS-4	3	3	3
GS-3	3	3	3
Total permanent positions	48	48	48
Unfilled positions, end of year	—	15	—
Total permanent employment, end of year	48	33	48

DETAIL OF PERMANENT POSITIONS
MUNICIPAL FUNDS

Fees and Other Collections, Recreation Department

Grade	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-9	1	1	1
GS-7	1	1	1
Total permanent positions	2	2	2
Unfilled positions, end of year	—	—	—
Total permanent employment, end of year	2	2	2

Student Loan Program

Grade	Actual FY 1977	Estimate FY 1978	Estimate FY 1979
GS-13	1	1	1
GS-9	1	1	1
GS-8	1	1	1
GS-5	2	2	2
GS-4	1	1	1
GS-3	1	1	1
Total permanent positions	7	7	7
Unfilled positions, end of year	4	4	3
Total permanent employment, end of year	3	3	4

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INTERNATIONAL
FINANCE

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95th Congress, 2d Session - House Document No. 95-320

the National
Advisory Council
on International
Monetary and
Financial Policies.
ANNUAL
REPORT
to the President
and to the
Congress for 1977

INTERNATIONAL FINANCE

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LETTER OF TRANSMITTAL

THE SECRETARY OF THE TREASURY
WASHINGTON

APR 14 1978

Dear Mr. Speaker:

As Chairman of the National Advisory Council on International Monetary and Financial Policies, I am pleased to transmit herewith the Annual Report of the Council for 1977.

This report includes, in accordance with section 4(b) of the Bretton Woods Agreements Act, as amended, an account of United States participation in the International Monetary Fund and the International Bank for Reconstruction and Development, together with related data and material concerning the operations and policies of the Fund and Bank. Similar information is provided with respect to the International Development Association, the International Finance Corporation, the Inter-American Development Bank, the Asian Development Bank and the African Development Fund, in accordance with legislation authorizing U.S. participation in these institutions. The report also includes information required to be submitted by the International Financial Institutions Act of 1970 (P.L. 91-599).

Copies of the report are also being submitted to the President and to the President of the Senate.

Sincerely yours,

W. Michael Blumenthal

W. Michael Blumenthal
Chairman, National Advisory Council
on International Monetary and
Financial Policies

The Speaker of the House
of Representatives
Washington, D. C. 20515

Enclosure

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I. OVERVIEW

1977 IN REVIEW

In 1977, the international community recorded its third year of expansion from the trough of global recession. During the year national policy makers introduced new measures, or realigned existing policies, in support of the continuing international adjustment efforts. International consultations took place frequently on pressing economic problems and priorities for action to ensure the compatibility, and the collective success, of national policies. These concerted efforts led to a considerable narrowing of divergences in national economic performance and external payments positions and the world economy moved in the direction of greater stability. While the adjustment process is far from complete, it is clear that the agreed strategy for sustained global economic expansion has proven to be both appropriate and workable.

Economic growth in the United States ranked among the most vigorous of the major industrial countries during the period under review. The 5.5 percent real growth rate target was met, and continued strong growth is anticipated during 1978.

At the same time, the economic performance of other strong developed countries, which also serve as the bellwether of growth for the rest of the world, fell short of expectations. Expansionary policy measures have, however, been adopted by these countries which should generate more vigorous growth rates in the year ahead.

The combined growth rate of the developing countries has surpassed that of the industrial countries since 1974 as it has for much of the past decade. These achievements of the developing countries, in the face of difficult domestic and international economic conditions, offer impressive evidence of improving management capabilities. However, in accordance with increased international emphasis on the adjustment of payments imbalances, rather than on financing, a number of the developing countries have recently adopted adjustment measures, or recognized the need to do so, in order to achieve more viable external positions.

Important steps forward in the critical field of energy policy have also been taken. The major initiative in the United States was the new Administration's development of the first comprehensive energy policy in American history. This program will lead to energy conservation and the reduction of U.S. dependence on oil imports from foreign sources. A number of other countries continued or intensified energy conservation efforts and programs as well.

The seriousness with which the oil importing countries are attacking energy problems was underscored by an unprecedented agreement in October 1977 among nineteen member nations of the International Energy Agency (IEA) to reduce their 1985 oil import levels 18 percent below projected levels. To accomplish this objective, IEA members will continue their active cooperation on conservation measures, pricing policies, and the development of alternative energy supplies.

The OPEC members collectively continued to record a very large current account surplus, as their revenues from higher-priced oil continued to exceed their absorptive capacities for imports. At the same time that OPEC member export receipts increased 7 percent, on the average, because of the two-tier increase in oil prices, their ability to absorb goods and services was limited by physical constraints in many countries and financial difficulties in a few others.

The counterpart deficit of the OPEC members' collective current account surplus was borne in large measure by the OECD countries which registered an aggregate current account deficit of roughly $33 billion, including official transfers. These transfers served to help reduce the external payments burden of the non-oil developing countries, which recorded a collective current account deficit of approximately $23 billion during the period.

Progress continued to be made toward the agreed international objective of achieving a better balanced and more supportable pattern of international current account payments surpluses and deficits. Several developed countries, which had been running substantial deficits that were not sustainable over the long run, took steps which enabled them to move back toward payments balance or even into payments surplus.

The non-oil developing countries continued to make progress, reducing their collective current account deficit for the second consecutive year, largely due to stabilization programs successfully instituted in Brazil and Mexico. If, as expected, their import restraints are relaxed, the collective deficit of the non-oil developing countries may increase again during 1978. This anticipated development renders it all the more important that the efforts of the stronger developed countries to increase consumption and growth rates succeed also in distributing the unavoidable collective payments deficit of all oil importing countries into a more sustainable pattern.

A major development during 1977 was the emergence of a sizable deficit in the current account of the United States. It reached about $19 billion on the statistical basis used during the year, and about $13 billion on the revised approach to be instituted during 1978 which, following the IMF Balance of Payments Manual, will treat the reinvested foreign earnings of American corporations as both investment income and an offsetting capital outflow. The increase in the deficit was caused by a further steep climb in oil imports and the relatively slow growth of major U.S. markets abroad.

Efforts by national policy makers to continue to curb inflation met with considerable success in 1977, although the overall improvement was somewhat concealed by sharp commodity price increases early in the year. More recently, progress in combating inflation has been resumed with the retreat of commodity prices and the negotiation of moderate wage settlements in a number of countries. Consumer price increases, however, continue to be in unacceptably high ranges. Equally troubling to global financial and economic stability is the very wide dispersion of inflation rates among countries—within the OECD area, for example, inflation rates range from less than 1 percent to about 30 percent. Given the impact of price performance on international competitiveness and payments positions, determined efforts by several countries to reduce cost and price pressures are essential if viable external positions are to be achieved. No country can yet afford to relax its vigilance if inflation is to be mastered on a global scale.

The world economy is clearly healthier and more vigorous than it was a year ago, but preoccupying problems persist. Rates of economic growth in most countries have not been adequate to reduce margins of unused capacity significantly or to stimulate industrial expansion adequately. As a consequence, the number of unemployed and under-employed persons in most countries remains intolerably high—and, in some countries, rising. In the United States, as in most other countries, the creation of new jobs, especially for youth and minority groups, remains a matter of high priority.

The fragility of world-wide recovery has been most stubbornly and disappointingly evident in the investment sector. Political and economic uncertainties both appear to be contributing to the depressed investment climate. Weak investment propensities prevail throughout the OECD area. Responding to the debilitating effects of oil price increases, dampened demand, narrower profit margins, and political unease in several countries, policy makers have labored to establish conditions conducive to an investment revival. Reassessments of the efficacy of current policies, plus special measures to stimulate investment, will continue to figure prominently in national fiscal and monetary policy formulation processes during the year ahead.

There also remain serious difficulties in the improved global payments pattern. While the developing countries were able to reduce their collective payments deficit by about $3 billion during 1977, most of the global reduction of deficits stemmed from an enormous swing in the current account of the United States balance of payments. Several other economically and financially strong developed countries (e.g., Japan, Germany and Switzerland) in fact remained in sizable surplus during the period.

This persisting "stickiness" of some elements in the global payments pattern poses serious problems. The possibility of widespread resort to trade restrictions and other illiberal practices remains a risk if real adjustment cannot be achieved at acceptable political and economic cost and within a relatively short period of time. The burden of payments adjustment simply cannot be borne alone by one group of countries—both surplus and deficit countries must participate equally in the adjustment process if an open and smoothly functioning international trade and payments system is to be maintained.

PHILOSOPHY OF THE CARTER ADMINISTRATION

The new Administration which took office in 1977 fully appreciates the importance of the international economy to the United States and, equally, the importance of the United States to the global economy. The Administration also recognizes that effective coordination of economic policy is one of the most difficult but important challenges it faces; hence it moved to establish a new decision-making and coordinating mechanism on the basis of four fundamental premises: (a) international and domestic economic policies cannot be separated organizationally—rather, nearly every economic issue has major international and domestic dimensions which must be considered simultaneously; (b) while economic coordination must engage virtually the entire Cabinet, a manageably small, permanent group of Cabinet officials should meet frequently to monitor and oversee the development of economic policies; (c) Cabinet officers, responsive to Congress, should be responsible for oversight and coordination; (d) successful coordination cannot be mandated formally but must be left flexible to accommodate the working styles and relationships between the President, the White House Staff and Cabinet members. The Economic Policy Group (EPG), chaired by the Secretary of the Treasury, satisfies these criteria and has served as an effective forum for the prompt consideration of major issues and the collegial development of economic policies by the new Administration.

Throughout this period the United States has been actively promoting economic cooperation and policy coordination among nations. Indeed, in the first week of the Administration, Vice President Mondale visited Europe and Japan to discuss economic and other priority issues—and to demonstrate the great importance which the Administration attaches to international cooperation.

The United States and the other participants at the London Economic Summit meeting in May 1977 recognized the critical importance of close cooperation among developed countries and agreed on a differential strategy for achieving non-inflationary growth and a sustainable global payments pattern. It was agreed at London to set specific targets for this purpose and, for the first time, to establish a review structure for monitoring progress toward achieving policy objectives. The first such high level policy review to implement these undertakings was held in Washington on September 30, 1977.

The United States also continues to consult with its developed country partners in the OECD to ensure the compatibility of national economic policies and to consult on policy modifications or realignments as warranted by the evolving international economic and financial environment. The process of setting national economic targets and multilaterally monitoring progress toward their achievement agreed upon at the London Economic Summit meeting was broadened in coverage at the OECD Ministerial Meeting in June 1977 to include all 24 member countries of the OECD. The first submission of national targets under this process, to cover the year 1978, was scheduled to take place in late 1977.

A major goal of the new Administration is to improve economic relations between developed and developing countries. The Conference on International Economic Cooperation (CIEC), which terminated in June 1977, was a significant step forward in this process. CIEC participants from the developed countries demonstrated their willingness to buttress rhetoric on world interdependence with concrete and meaningful actions. Both the developed and developing countries explicitly recognized the mutual interest of strengthening their commercial and financial ties. The commitments made at CIEC to increase the effectiveness and volume of aid flows, to provide adequate official financing and to strengthen the international trading system—in particular by reaffirming the pledge made at the beginning of the current Multilateral Trade Negotiations (MTN) to provide developing countries with access to the markets of the developed countries—reflected both the self-interest of developed countries and increased recognition of developing countries' needs. While a number of issues were not resolved at the Conference, the CIEC was useful in setting forth an agenda for the future and in creating a global atmosphere conducive to further cooperative action. (The CIEC is discussed in more detail in Chapter II of this report.)

Strengthening the International Monetary Fund (IMF)

The success of efforts to promote economic recovery and attain a more sustainable pattern of international payments depends importantly on the continued maintenance of a strong and open international trade and payments system. Cumulative world current account deficits since 1974 have totaled about $225 billion, nearly three quarters of which has been financed by borrowings from private capital markets. These markets can, and will continue to, provide the bulk of the needed funds. Some countries, however, have approached the limits of creditworthiness and hence have faced difficulties in obtaining all the financing they may need from traditional sources. Under such circumstances, these countries might be forced to take disruptive steps such as sharply restrictive domestic policies or protectionist controls which would be injurious to national and international stability and well-being. The availability of adequate official financing is thus vital to the promotion of orderly adjustment and to the bridging of potential financing gaps until corrective policies can be effectively implemented.

As the principal source of official multilateral balance of payments financing, the IMF plays a central role in dealing with current economic problems. IMF financing has risen sharply over the last few years, amounting to about 7 percent of total payments financing. As a consequence of this record use of its resources, the amount of the IMF's usable assets has been reduced to levels that are low, both by historical standards and in relation to potential official financing needs (with large payments imbalances expected to continue).

Several steps have been taken to augment IMF resources. Member country quotas will be increased with the implementation of the Sixth Quota review agreed upon in 1976. A further increase in quotas is currently being considered, but it is not expected that the increased resources would be available to the IMF for some time.

In April 1977 the IMF Interim Committee decided to strengthen the IMF's capacity to provide financing and promote adjustment through the establishment of a temporary, $10 billion, Supplementary Financing Facility. Financing for this Facility is to be provided on a roughly equal basis by the developed and the oil-exporting countries which are in strong financial positions. The resources will be used to furnish additional funds to countries with financing needs that are large relative to their access to regular IMF resources and which need adjustment periods longer than is usually allowed under IMF rules. A borrower from the new Facility must, however, agree with the IMF on an economic and financial program designed to place its payments position on a sustainable basis.

The Supplementary Financing Facility is a major cooperative international effort which will make a significant contribution to preserving an open world economy. It will encourage countries to initiate corrective measures in a timely fashion through sound and internationally responsible policies. Moreover, it will provide the confidence essential to the continued flow of private funds by assuring that adequate official financing is available if the need arises.

The National Advisory Council (NAC) concluded that the establishment of the Facility is in the national interests of the United States and strongly recommended approval of legislation to authorize U.S. participation in the Facility up to its share of $1.7 billion. Congressional consideration of this legislation was underway as fiscal year 1977 ended.

In addition to being a source of official financing, the IMF's Articles of Agreement constitute the rulebook for the operation of the international monetary system and the IMF is responsible for overseeing the operation of the system in conformity with these rules. During the past year a general revision of the IMF Articles of Agreement, which will provide the new legal framework for the monetary system and enhance IMF responsibilities and authority, was agreed upon. As the fiscal year ended, the process of IMF member country ratification of this general revision was about three quarters completed—the United States completed its ratification in 1976.

A major change in the revised Articles of Agreement of the IMF is the introduction of more flexible exchange rate arrangements. Countries will have wide latitude in their choice of exchange rate practices, subject to adherence to specific undertakings regarding the promotion of orderly underlying economic conditions and the avoidance of manipulation of exchange rates or the system to prevent adjustment or to gain unfair competitive advantage. In order to ensure compliance with these new provisions, the IMF has been authorized to exercise firm surveillance over member country exchange rate policies and practices. During the period covered by this report of the NAC, agreement was reached on principles to guide IMF member policies and on rules and procedures for IMF surveillance. (International monetary developments and the IMF are discussed in more detail in Chapter III of this report.)

Increased Commitment to Development

The new Administration's initial review of development policy concluded that the United States has vital economic, political, security and humanitarian interests in the developing countries of the world. These countries must, for example, play a major role in the efforts to find global solutions to the problems of world hunger, population growth, energy shortages, resource depletion, nuclear weapon proliferation, and other difficulties of universal concern. In its review of economic aid programs the new Administration, noting that U.S. assistance had declined progressively both as a share of GNP and in real terms over the past 25 years, decided that the United States could make a more significant contribution in this area.

At the CIEC Conference the developed countries in the Group of Eight agreed to provide a $1 billion Special Action program for the benefit of low income developing countries with the most pressing financial needs. As the U.S. contribution to this program, President Carter will seek Congressional approval for appropriations which, by fiscal year 1979, will increase our bilateral assistance to the poorest countries by approximately $375 million over current levels. This commitment explicitly recognizes that foreign assistance is the most direct and effective method of transferring resources for development, while minimizing distortive effects on the efficient allocation of global resources.

Basic Human Needs

In assessing and directing United States foreign assistance programs, the new Administration has ascribed highest priority to helping meet the basic human needs of the poor. This emphasis is consistent with the legislative guidance for the program set forth in the 1973, and subsequent, amendments to the Foreign Assistance Act. The Agency for International Development (AID), which administers our bilateral economic assistance, has redirected its program in an attempt to reach the poor more directly than it has in the past. The new Administration has endorsed this effort to address the basic human needs of people in the developing countries by helping them to increase productivity and incomes so they can, over the longer run, satisfy their own needs without concessional aid.

Further Congressional support for emphasis on helping the poor is embodied in amendments to our food assistance legislation (P.L. 480) which set a minimum tonnage of commodities (1.5 million tons for fiscal year 1978) for grant humanitarian programs and require that 75 percent of the food under the concessional sales program be destined to countries having an annual per capita income of $550 equivalent or lower.

International Development Banks

In 1977, the Congress authorized $5.1 billion for U.S. participation in the latest replenishments of the international development lending banks. It appropriated $340 million as a supplemental contribution in fiscal year 1977, and $1.9 billion for fiscal 1978. Hence, the role of the banks rose sharply in the overall U.S. foreign assistance program.

At the same time, Congress raised a number of serious questions about the banks and about U.S. participation in these institutions. In recognition of the importance of the international development lending institutions (IDLIs) in U.S. relations with the developing countries, the Treasury Department under the new Administration undertook an in-depth review of IDLI effectiveness in helping to achieve U.S. development objectives. This study covered the facilitating role of the IDLIs in: (a) bringing developing countries into an open, flexible, dynamic world economic order; (b) furthering the global and developing country adjustment processes required by the oil crisis and ensuing recession; (c) reaching the poor through basic human needs projects; (d) influencing developing country development strategies; (e) advancing the U.S. human rights strategy; and (f) a range of administrative issues. After consultations and discussions with Congress, this report on the development banks is scheduled to be issued during the Second Session of the 95th Congress.

Although our policies vis-a-vis the international development banks are currently being reviewed, several key conclusions can nonetheless be identified. *First*, the United States believes that the IDLIs can play a significant role in helping meet the basic human needs of the world's poor. Therefore, we strongly support recent efforts by the banks to increase their lending to projects which seek directly to improve the productivity and income levels of the poorest people in developing countries.

Second, the United States believes that its assistance through the IDLIs must take full account of the human rights policies of recipient countries. Reflecting this concern, the 1977 legislation authorizing further U.S. participation in these banks requires that the United States seek to channel assistance toward countries in such a manner as to advance the cause of human rights.

Third, the United States is concerned with the disparity between salaries paid by the development banks and the salary scales of national governments and the private sector, and with other administrative costs which appear to be inconsistent with the basic purpose of the banks to assist less fortunate people. The United States is making every effort to encourage the banks to eliminate unnecessary expenses and increase efficiency.

Finally, the new Administration recognizes that Congress must fully support the IDLIs if U.S. policy toward them is to be successful and sustainable. The Administration is committed to full consultations with Congress regarding new United States contributions to these institutions and indeed all aspects of U.S. policy towards them.

Stabilization of Export Earnings

The United States favors stabilization of export earnings and has thus supported the creation and expansion of the Compensatory Financing Facility (CFF) in the IMF. The conditions of access to the CFF were substantially liberalized in 1975, shortly after world commodity prices had reached their lowest point in the 1974–75 boom-bust cycle. The experience of the past 2 years suggests that the size and terms of access of the CFF are adequate to meet the current needs of most developing country commodity exporters for the emergency financing of export shortfalls.

Nevertheless, the United States agreed in September 1977 to a proposal in the IMF/IBRD Development Committee for IBRD and IMF staffs to undertake a study of export earnings stabilization, including the CFF and its adequacy. This study is now underway and is scheduled to be ready for consideration by the Development Committee in September 1978. The United States will consider the results of this study, and any recommendations which may be made at that time, on their merits. Any proposal for further changes in the CFF should be reviewed in conjunction with other international efforts to deal with the problem of unstable export earnings, including the UNCTAD discussions of international commodity agreements and a common fund.

World Development Program

At the initiative of the United States, and with the endorsement of participants in the London Economic Summit meeting last May, the World Bank (IBRD) is to prepare a World Development Program (WDP) designed to provide a coherent framework for development. This study is also to serve as a guide in assessing progress in reaching internationally-agreed objectives in the field of economic development. The United States envisages a WDP which has a major impact on individual human lives as well as on national policy initiatives and looks forward to establishment of the first comprehensive program for development in 1978.

Trade Policy

The new Administration's trade policy was tested early in 1977 on both the domestic and international fronts. The maintenance of open markets is an essential element of the Administration's policy, and significant further liberalization of international trade through the Multilateral Trade Negotiations (MTN) is considered crucial to the future welfare of all countries. Protectionism must be vigorously resisted, both at home and abroad, to avoid real injury to the world economy in a period of difficult transition from recession to renewed global economic growth.

The United States lead in trade initiatives continued to be an important bellwether for action by other countries. If the United States imposed unilateral trade restraints, there is little doubt that others would soon follow suit and the global trading system as a whole would suffer. The United States remained a strong advocate of a public commitment by all major countries to keep markets open and to avoid exporting internal problems and increasing the adjustment problems of others. The London Economic Summit Declaration of May, and the renewal of the OECD Trade Pledge in June, reconfirmed this commitment and clearly demonstrated U.S. resolve to cooperate closely on trade issues.

The London Summit also pledged the major industrialized nations to "give new impetus to the Tokyo round of multilateral trade negotiations," aiming for substantive progress in key areas during 1977. In support of these commitments, considerable effort was put into resolving the impasse on agricultural negotiations between the United States and the European Community (EC), which had virtually stalemated serious discussions among the major trading nations. A significant policy breakthrough with the EC and other MTN participants was achieved in July and an agreed schedule of target dates for the negotiations established. This understanding provided new momentum to the MTN and created a sound basis for further agreements on trade liberalization.

The new Administration's firm commitment to free trade and open markets was tempered by the pragmatic recognition that international trade in practice can be free only if it is also fair. Unfair foreign trade practices may provide imported goods at lower cost to domestic consumers, but such practices can also seriously undermine the capability of domestic industries to compete.

The sharp increase in U.S. imports of certain products during 1976 and early 1977 led to deep concern in some industries that imports were threatening both their traditional position in domestic markets and the jobs of American workers. The new Administration committed itself to act expeditiously to protect American jobs and industries. These actions included rapid processing of complaints against unfair trade practices, and consideration of relief from injurious foreign dumping and from government export subsidies through the imposition of anti-dumping or countervailing duties.

While U.S. export industries remain generally competitive in international markets, continued efforts toward encouraging U.S. exports and in gaining access to markets heretofore artificially denied to U.S. suppliers are essential. The United States Government has improved the flow of information about foreign market trade opportunities to domestic industries.

The new Administration is seeking to ensure that exporters shall be free to compete on the basis of specifications, price, quality, delivery schedule and service, rather than through export subsidies, including subsidized credit. To this end a broader and stronger consensus on export credit has been negotiated. The U.S. is also actively negotiating the reduction or elimination of tariff and non-tariff barriers to our trade through the MTN, including a new understanding on the use of subsidies and countervailing duties.

Commodity Policy

The United States, under the new Administration, undertook a four-fold approach to international commodity problems during 1977. *First,* it adopted a positive and open attitude toward the negotiation of individual commodity agreements (in particular buffer stock arrangements) to stabilize prices around market trends. A primary, stated, purpose in pursuing such agreements is to reduce the risk of inflationary pressure in the U.S. economy. *Second,* the United States agreed at the CIEC in May 1977, along with other developed and developing countries, that there should be a common fund to facilitate the financing of buffer stock arrangements. *Third,* the United States sought to promote increased investment in the production of key raw materials through increased involvement in such activities by the international development lending institutions and the U.S. Overseas Private Investment Corporation (OPIC). *Finally,* it was decided to continue to review existing mechanisms to assure adequate support for the stabilization of export earnings of the developing countries.

Much of the attention of the new Administration in the commodities area has focused on the type of buffer stock arrangement which would be most economically rational and that would equitably balance the interests of consumers and producers. It has been concluded in this connection, for example, that the United States should seek to provide sufficient financial resources to agreements it joined—including U.S. and other consuming country contributions—to accumulate buffer stocks large enough to be effective in protecting both against price surges and price declines. It has also been decided to limit the use of export quotas in support of buffer stocks to extreme situations, and to oppose production controls in any buffer stock arrangement.

To carry out this policy, the Administration indicated that it would seek Congressional approval for a U.S. contribution to the buffer stock of the International Tin Agreement—the first such contribution ever made by the United States. It also successfully negotiated an International Sugar Agreement, to take effect in early 1978.

II. SIGNIFICANT INTERNATIONAL ECONOMIC AND FINANCIAL DEVELOPMENTS DURING 1977

- During 1977 the international economy entered the third year of its expansion path from the 1974–1975 recession although most of the major developed countries experienced lower rates of growth in late 1976 and during the first three quarters of calendar year 1977 than had been the case in earlier phases of the recovery. This moderation of growth rates stemmed essentially from slower-than-expected expansion in the lead economies and, to a lesser extent, from attempts by some countries to reduce domestic inflation and unsustainable external deficits.

- Oil price increases coupled with worldwide inflation and recession have led to major changes in the pattern of world current account payments balances. The cumulative OPEC surplus during the period 1974 to 1976 was about $150 billion while, concurrently, OECD-developed countries experienced an abrupt aggregate current account position shift from moderate surplus to a very large deficit. Thus, for example, instead of continuing to be major net suppliers of capital to the rest of the world, the OECD countries have become substantial net capital importers.

- The fundamental objective of U.S. international energy policy is to minimize the economic consequences of the current international energy situation, in part, through reducing U.S. dependence on foreign oil and minimizing U.S. vulnerability to supply interruptions. This objective, attainable only through continued consultation and cooperation among oil-consuming and oil-producing countries, both developed and developing, was actively pursued during the past year in the Energy Commission of the Conference on International Economic Cooperation (CIEC) and in the International Energy Agency (IEA).

- Relations between the developed and the developing countries assumed new and important dimensions during the period covered by this Report of the NAC, the Conference on International Economic Cooperation (CIEC) being the major focus. The "dialogue" between the two groups of countries was characterized by a willingness to engage in a serious and cooperative search for mutually beneficial solutions to economic problems and for measures to stabilize the international economic system. The United States assumed a leadership role in directing this dialogue into constructive channels and advanced several initiatives designed to serve the long-term interests of both developing and developed countries and to promote world economic and financial stability.

- Commodity issues continued to loom large in the dialogue between the developed and the developing countries. The acute balance of payments difficulties encountered by many developing countries following the oil price increases and the world-wide recession and the extreme price volatility that prevailed in world commodity markets in recent years have served to focus the attention of the developed and developing countries on the possible benefits of increased market stability by means of international commodity agreements. In this connection, the new Administration has adopted a positive and open attitude toward the negotiation of individual commodity agreements to stabilize prices around market trends, the view being that such stability would not only contribute to worldwide economic development but should also help reduce domestic inflationary pressures. The Administration is also seeking to use existing national and international institutions to increase world production of raw materials as a means of reducing the likelihood of shortages in the future as well as to promote overseas development through investment in raw material production projects.

- The developing countries have also continued to press for relief from external debt-servicing obligations, even though the combined current-account deficit of the non-oil developing countries declined in 1976 and 1977, and the growth of output and trade substantially increased the capacity of these countries, as a group, to service such debts. Inflation has further reduced the real burden of past debts. In several international forums during 1976/77 the developing countries opted to place emphasis on obtaining immediate and generalized debt relief—essentially as a means of obtaining additional development assistance. The traditional "creditor clubs" which examine individual cases of default or imminent default have been criticized as inadequate and inequitable. In particular, debt relief was a major issue in the CIEC talks, discussed in some detail in this chapter of the NAC *Annual Report.*

WORLD ECONOMIC AND FINANCIAL TRENDS

During 1977 the world economy entered the third year of its expansion path from the 1974–1975 global recession. Most of the major developed countries experienced lower rates of growth in late 1976 and during the first three quarters of calendar year 1977 than had been recorded during the earlier phase of the recovery and as a result real economic growth in the Organization for Economic Cooperation and Development (OECD) area will likely average slightly below 4 percent in calendar 1977, as compared with the 5.25 percent real growth rate registered in calendar year 1976. This slowing-down stemmed essentially from the slower-than-expected growth rate in the lead economies and, to a lesser extent, from policy attempts to reduce domestic inflation and unsustainable external deficits.

The non-oil developing countries are also likely to experience roughly the same growth rate this year as they did last year, with the IMF and World Bank estimating real growth for these countries at roughly 5 percent in 1976. Mexico and Brazil instituted major adjustment policies during this period and will likely have lower growth rates in 1977 as the processes of readjusting domestic imbalances proceed. Other developing countries that adopted stabilization programs earlier are likely to experience somewhat higher growth rates in 1977 than they did a year ago. Global economic conditions are thus considerably improved over the recent past but are still less than satisfactory in terms of the world's needs.

The sharp increase in crude oil prices in 1973 and 1974 triggered one of the severest shocks the world economy has experienced in modern times. The price increases aggravated existing inflationary pressures caused by synchronized global expansion and the commodity boom. The result was the deepest international recession since the 1930's, coupled with rapidly rising prices. During this recession: (a) real growth among developed countries plummeted from an average rate of 5.5 percent in the period 1960 to 1972 to a decline of 1 percent in 1975: (b) inflation rates rose from a 1960–1972 average of 3.8 percent to 13.5 percent in 1974, and to 10.5 percent in 1975; and (c) unemployment rates nearly doubled from the 2.8 percent rate of the period 1963 to 1972.

Another dramatic consequence of the oil price shock was an abrupt and fundamental shift in the pattern of world current account payments balances. The developed countries as a group—historically capital exporters—were suddenly confronted with the need to finance a very large current account deficit. OPEC countries began to accrue oil revenues at levels far beyond their current spending needs and to face investment decisions of a magnitude never before encountered. The non-oil developing countries witnessed their carefully managed current account deficits jump as a result of generally higher import prices coupled with reduced demand for their exports. Developing countries with deficits circumscribed by the volume of aid and other capital receipts faced the need to retrench. The aggregate annual total for the countries running current account deficits during the period 1974 to 1976 averaged $75 billion, or quintuple their average deficits during 1971 to 1973.

By late 1977, the world economy was in an awkward transition stage with new policies having been implemented but the results not yet emerging: (a) apart from the United States and Japan, real domestic demand growth in the developed countries was essentially flat during the summer months; (b) several major developing countries experienced slower growth rates as stabilization policies took hold; and (c) inflation rates, as measured by cost-of-living indices, in the developed world were higher during the 12-month period ending June 1977 than the average in 1976—the average inflation rate still exceeds 8 percent.

There were, however, important signs of progress: (a) stabilization efforts by major countries, both developed and developing, have been more successful than expected—inflation rates have been curbed in some countries and current account imbalances have been significantly reduced in others; (b) progress on the inflation front has been erratic—during the first quarter of 1977, inflation rates quickened, reflecting a sharp rise of commodity prices and the impact of wage settlements. During the summer months, however, cost-of-living increases began to ease up somewhat.

The less developed countries of Latin America have made particularly significant progress in controlling domestic inflationary pressures with consumer price increases down by about one third as compared with 1976 while in the OECD area, cost-of-living increases are still exceeding an 8 percent average although the trends of the last few months have been encouraging. Commodity prices have softened and wage settlements have been slightly more moderate in many countries and payments patterns have undergone impressive shifts amongst countries—reduced current account deficits for the United Kingdom, Italy, Brazil, Mexico and France offer substantial evidence that adjustment measures do in fact work.

Several countries are initiating new stabilization programs which should bear fruit next year and both Japan and Germany have reaffirmed their commitments to the attainment of real growth goals. The vigorous rate of growth in the United States during the first half of calendar year 1977 brought about a major change in the U.S. trade position, however. Merchandise imports in the first half of 1977 were $16.6 billion higher than in the first half of 1976. This shift in the U.S. trade balance was at an annual rate of about $24 billion.

INTERNATIONAL BALANCE OF PAYMENTS SITUATION AND FINANCING PATTERNS, 1973 TO 1976

The oil price increases of 1973 and 1974, worldwide inflation, and the deepest world recession since the 1930's combined to bring about major and unprecedented changes in the pattern of world current account payments balances. OPEC country surpluses, which had been about $6 billion in 1973, jumped to $68 billion in 1974 and the cumulative OPEC surplus during the period 1974 to 1976 totaled about $150 billion. Concurrently, the developed countries of the OECD recorded an abrupt shift of their aggregate current account position from one of moderate surplus to a very large deficit—instead of continuing to be major net suppliers of capital to the rest of the world, the OECD countries became substantial net capital importers.

The traditional and widely accepted view that "mature" economies should be net capital exporters was thus dramatically rendered obsolete, with the OPEC surplus countries generating large volumes of net savings which were used by the OECD countries and (often after intermediation through OECD country capital markets) by the non-oil exporting developing countries. During the period 1974 through 1976, the combined OECD current account position registered a deficit of about $22 billion annually, as compared with an average current account surplus position for this same group of countries in excess of $5 billion during 1971 to 1973. Within the OECD area, a few countries had payments surpluses in the 1974 to 1976 period averaging $15 billion per year—notably Japan, Germany, Switzerland and the Netherlands—while the combined position of the OECD member countries in deficit deteriorated from a deficit of $7 billion per year during 1971 to 1973 to a deficit of about $37 billion annually in 1974 to 1976.

The position of the non-oil exporting developing countries also changed drastically. During the 1960's and early 1970's these countries had generally sought carefully to control their current account deficits within the limits which could be financed by foreign assistance and other capital inflows. Between 1971 and 1973, the average annual aggregate deficit of the non-oil exporting developing countries was roughly $4 billion. In the wake of the oil price increases (combined with other increased import costs), however, the aggregate annual deficits of these countries rose nearly six-fold, to an annual average of about $23 billion during the 1974 to 1976 period.

There has, in addition, been a dramatic change in the external balance of the "rest of the world," category (which includes Israel, South Africa and the non-market economies of Eastern Europe, the USSR, and the People's Republic of China). These countries ran near-balanced current account positions during 1971 to 1973, carefully tailoring import purchases to export proceeds and normal financing flows. The oil crisis and worldwide recession, coupled with increased domestic demand for consumer goods led to a sharp increase in the current account deficit of these countries to $12 billion annually during the period 1974 to 1976. The shifts in payments patterns for these groups of countries are summarized in Table 1.

Under these circumstances, countries borrowed very heavily during the years 1974 to 1976 to finance the large current account deficits. This borrowing took many forms. While official financing through the IMF was well above historical levels and official development lending increased, private markets provided the bulk (about three-quarters) of total balance of payments financing during the period.

TABLE 1.—*World Payments Patterns*

Balances on goods, services, and private and governmental transfers

[$ Billions]

	Average 1971–73	Average 1974–76
Surplus Countries		
OPEC	2.8	49.0
OECD	12.3	15.3
Total Surpluses	+15.1	+64.3
Deficit Countries		
OPEC	– 1.4	– 2.0
OECD	– 6.7	–37.3
LDC	– 4.1	–23.0
Other[1]	– 2.7	–12.3
Total Deficits	–14.9	–74.6
Residual[2]	– 0.2	+10.3

[1] Israel, South Africa, and non-market economies of Eastern Europe, the USSR, and the People's Republic of China.

[2] Over the past several years the "residual" item has grown significantly. Recorded exports exceed imports by a sizable sum for any calendar year due to goods in transit and inflation. The OECD staff has estimated that $12–$14 billion is involved in these factors. These factors would by themselves make the residual negative rather than positive. Both the IMF and OECD attribute the positive residual to asymmetries in the reporting of service transactions, that is, an over-reporting of service imports, or under-reporting of service exports.

Source: OECD and U.S. Treasury Department staff estimates.

In addition to expanded demand for credit, conditions on the supply side of the capital markets were also conducive to a rapid growth of private financing during the period. The large OPEC surpluses brought very substantial deposits and placements to recipient banks and other financial intermediaries, greatly expanding the assets of those institutions. The period was also one of rapid secular expansion in the international banking system. With domestic loan demand less buoyant than in the immediately preceding period, many institutions were competing vigorously for new customers abroad. Banks sought to become established in new fields of activity and new geographic areas and endeavored to broaden their scope of operations in order to spread risks and diversify portfolios. In addition, the Eurobanks lengthened loan portfolios by increasing their participation in medium-term (5 to 7 year maturities).

Using available (incomplete) data, the pattern of world payments financing in the period 1974 through 1976 appears to have had roughly the following dimensions:

(a) Cumulative current account deficits amounted to about $225 billion (after receipt of grant aid), representing the counterpart of the investible surpluses of OPEC countries plus certain developed countries.

(b) About $15 billion of these deficits (seven percent of the total) was financed by the IMF, largely through the temporary Oil Facility and the Compensatory Financing Facility, both of which provided financing largely on the basis of "need" with relatively little emphasis on "conditionality" or through the adoption of corrective adjustment measures by the borrowing countries.

(c) About $40 billion of the deficits (eighteen percent) was financed through other official sources—development lending from other developed and OPEC countries, from the World Bank and the regional development banks, and from other official sources of financing.

(d) The remaining current account deficits—some $170 billion plus about $40 billion of debt repayments—were financed mainly through market-oriented borrowing, mostly through banks and securities markets.

The payments financing patterns of the past few years reflect the initial emphasis countries placed on *financing* imbalances rather than *adjusting* their economies so as to reduce or eliminate the large imbalances. At the time of the initial shifts in payments patterns consequent to the oil price increases, there were serious concerns that the oil importing nations, trying individually to protect their own payments positions, would injure one another by external restrictions and excessive domestic retrenchment in their efforts to eliminate deficits which (as the counterpart of the OPEC surplus) were, collectively, irreducible. Recognizing these dangers, the IMF membership agreed in Rome in January 1974 to foreswear recourse to such self-defeating actions.

Accordingly, in the early aftermath of the oil price increases, emphasis was appropriately placed on assuring the adequacy of resources for financing the balance of payments costs of higher oil import costs. Countries were encouraged, at least temporarily, to accept the oil deficit and finance it, rather than to try individually to eliminate their respective deficits at the expense of other oil importing countries. Much of the financing made available by both private and official sources was essentially untied to requirements that particular adjustment policies and programs be implemented.

Given the large amount of international financing that has taken place during this period, accumulations of external debt—especially to private institutions—have been large by historical standards. Precise data on the aggregate amount of external debt outstanding are not available, but the following statistics (some of which overlap) give some indications of the current situation:

(a) The World Bank estimates the outstanding external debt of 75 non-oil exporting developing countries at about $171 billion as of the end of 1976.

(b) The OECD estimates that aggregate foreign borrowing by OECD deficit countries during the years 1974 to 1976 amounted to roughly $98 billion.

(c) The foreign claims of commercial banks on countries other than the G–10 major developed countries, Switzerland and the offshore banking centers, totaled $194 billion at the end of 1976 (of which U.S. banks accounted for roughly $82 billion).

(d) Foreign claims of commercial banks on the G-10 major developed countries, Switzerland and the offshore banking centers (which includes inter-bank lending and thus involves substantial double-counting), were about $354 billion at the end of 1976, of which U.S. banks accounted for roughly $126 billion.

These data are difficult to evaluate. It might be noted, as a rough rule of thumb, that bank claims, both on G-10 countries and others, approximately doubled during the 3 years 1974 to 1976 and outstanding external public debt of the 75 non-oil developing nations more than doubled during the same period. Doubling the absolute amount of debt does not, of course, mean doubling the "real burden" of such debt since price increases generally reduce the burden in real terms and economic growth strengthens debtor capacity to service debt.

Sketchy data on developments during calendar year 1977 suggest further movement toward a sustainable worldwide payments pattern. The OPEC surplus is likely to remain in the $40 billion range; the OECD balance may decline to from $30 to $33 billion (largely reflecting the sharp shift in the U.S. position) and the non-oil developing countries may experience a $2 to $3 billion reduction of their combined deficit as stabilization measures reduce imports and continued growth in the OECD area leads to increased demand for their exports.

This improvement in the non-oil developing countries' situation is already being reflected in rising foreign exchange reserves. After rebuilding reserves some $12 billion in 1976, the non-oil developing countries increased their aggregate reserve position by another $5 billion during the first half of calendar year 1977. This further improvement in the position of these countries should be sufficient to permit some easing of external constraints next year.

OFFICIAL RESERVE POSITIONS

The level of gross official international reserves of IMF member countries and Switzerland rose some $30 billion, or 13.3 percent, during calendar year 1976. Reserve growth was slightly faster (7.7 percent) during the first half of calendar 1977, rising some $20 billion. (See Table 2.)

SITUATION OF THE NON-OPEC DEVELOPING COUNTRIES

The situation of the non-OPEC developing countries improved considerably during 1976, a trend which, as previously noted, is expected to continue in 1977. The improvement was manifested clearly in the aggregate current-account deficit (excluding the receipt of official transfers) of these countries, which declined from $37 billion in 1975 to $26 billion in 1976. A further decline of about $3 billion is projected for 1977.

This improvement in the balance of payments position of the non-oil developing countries was largely due to buoyant exports to the developed countries at improved terms of trade while import levels rose relatively more slowly. Export earnings increased by about 20 percent in 1976 to a level of around $110 billion while export volume rose more than 12 percent. At the same time, imports (f.o.b. basis) by these countries increased only 4 percent, to about $125 billion, with the increase in import volume being scarcely one percent.

The rapid growth in exports was associated with the economic recovery in the developed countries, while the absence of growth in imports was associated with stabilization programs implemented by several key developing countries coupled with efforts by many others to restrain imports. Growth in GDP for the non-oil developing countries in 1976 averaged around 5 percent, up from 3.5 percent in 1975, but was still below average growth rates recorded during the preceding 10 to 15 years.

Available data for 1977 indicate the continuation of the trends set in 1976. It is estimated that exports by the non-oil developing countries will again increase substantially, particularly because commodity prices were especially firm during the first half of the year. Imports, how-

TABLE 2.—*Official Reserves of IMF Member Countries and Switzerland*
[$ Billions]

	1972	1973	1974	1975	1976	1977	
			(end year)			March	June
Total Reserve Assets	159.1	183.7	220.6	227.7	258.1	265.0	278.1
Gold Stock	38.7	43.0	43.5	41.6	41.1	41.3	41.4
SDR	9.4	10.6	10.8	10.3	10.1	9.9	10.0
Reserve Position in Fund	6.9	7.4	10.8	14.8	20.6	21.6	22.1
Foreign Exchange	104.4	122.7	155.4	161.1	186.3	192.2	204.5
(U.S. Liabilities)	61.5	66.8	76.7	80.7	91.9	96.8	103.0

Source: International Financial Statistics, IMF.

ever, are expected to increase more rapidly than was the case in 1976 but still not so much as to offset the impact of increased exports.

In 1976, the pattern of financial flows to the non-oil developing countries changed very little from that of the previous year, with about $20 billion in net official flows (including transfers) having been received. The bulk of these flows were from DAC member countries and the multilateral financial institutions. About $5 billion was provided by OPEC member countries.

Net private direct investment in the non-oil developing countries continued at the level of about $4 billion and other private capital flows remained at high levels as well. In particular, gross private borrowing by these countries continued at its recent rapid pace. Publicized Euro-credits and bond issues during 1976 amounted to $11.0 billion as compared with $7.5 billion in 1975 (gross basis). Net borrowing from the IMF and other reserve-related credit was on the order of $2 to $4 billion. Altogether, capital flows to the non-OPEC developing countries exceeded current requirements gross by a substantial margin and, as a consequence, their international reserves increased 37 percent during 1976 to a level of $41 billion by the end of the year and by an additional 10 percent in the first half of calendar 1977.

Although gross borrowings from private capital markets by the non-oil developing countries continued at high levels in the first half of 1977, external financing appears to be shifting toward a more "normal" pattern in which official flows (on a net basis) constitute a larger proportion of total net flows. In addition, more of the borrowing this year represents the rolling-over of maturing debt. If the rate of borrowing by these countries continues unabated throughout the second half of 1977, foreign exchange reserve accumulations are again likely to be in the $10 billion range.

There were corresponding changes in the external debt situation of these countries during the period covered by this NAC Report. Although external debt increased substantially in 1976 for the third year in a row, the rate of increase in debt during 1977 is expected to be somewhat lower. As a result of these overall trade and payments trends the creditworthiness of the non-OPEC developing countries as a group has been improving and if current trends continue, the magnitude of their external debt relative to their capacity to repay (as indicated by GDP and exports) will soon return to historical levels.

From the standpoint of economic growth also, the non-OPEC developing countries are returning to a more normal situation. The average growth rate for all developing countries in the 1960's was 5.5 percent per annum. In 1975, average GDP growth in the non-OPEC developing countries bottomed-out at around 3 percent. In 1976, average growth returned to a level of about 5 percent and is expected to be at this level for 1977 as well.

While the situation of the non-OPEC developing countries is thus reassuring *in the aggregate*, a few countries dominate the aggregate figures. Three countries (Brazil, Mexico and India), for example, account for about half of the GNP and half of the population in the non-OPEC developing countries, and the deficits of these three countries set the pace for the other developing countries in 1974 and 1975. During 1976, the effects of stabilization programs in Brazil and Mexico began to be felt and their deficits commenced to decline significantly.

India experienced a rather dramatic improvement in its balance of payments situation of over $2 billion between 1975 and 1976 as a result of favorable harvests and unexpectedly large private remittances. However, the poorest of the non-oil countries, those having per capita income of less than $200 (equivalent) per year, have experienced virtually no growth in per capita terms since the beginning of the decade, and their prospects for more rapid growth in the near future do not appear to be bright.

Another useful distinction to be made is between those developing countries that finance payments deficits primarily through borrowings from private sources and those that rely predominantly on official flows, or a combination of private and official finance. There are about a dozen countries in the first group (Brazil, Mexico, Korea and the Philippines are examples) and about seventy countries in the second category (Bolivia, India and Zaire for examples). In general, the deficits of the first group rose more sharply in 1974 and 1975 than the deficits of the second group. This pattern is now shifting in that the privately-financed countries are accounting for a progressively smaller share of the aggregate non-OPEC developing country deficit. Among the non-OPEC developing countries there are, of course, a few that appear to be in particularly strong balance of payments situations at the present time while there are also a few countries facing especially difficult situations.

OPEC CURRENT ACCOUNT TRENDS

The combined current account surplus (excluding official transfers) of the thirteen members of the Organization of Petroleum Exporting Countries (OPEC) in 1977 is expected to decline but slightly from the near $42 billion level attained in 1976. Since year-end 1973, the cumulative OPEC surplus has totaled almost $150 billion, of which about $125 billion was earned by four Gulf countries (Saudi Arabia, Kuwait, Iran and the United Arab Emirates) and $65 billion of this was by Saudi Arabia alone. Estimates of the OPEC current account position for 1976–77 are contained in Table 3 of this Report.

TABLE 3.—*OPEC Current Account*
[$ Billion]

	1976	(Forecast) 1977
A. *Current Account:*		
Oil Exports (Government-Take)	115	128
Non-oil Exports (f.o.b.)	8	10
Imports (f.o.b.)	−68	−82
Trade Balance	55	56
Services and Private Transfers	−14	−15
Current Account Balance (ex Gov't Transfers)	41	40

B. *Current Account Balances:*

[$ Billion]

	1976	(Forecast) 1977
Surplus Countries	44	43
Deficit Countries	−2	−3
TOTAL OPEC	41	40

Source: Treasury Department.

OPEC oil earnings (government-take basis) totaled over $115 billion in 1976 and should reach $128 billion by 1977. Oil demand in 1976 was bolstered by strong economic recovery, especially in the United States, and heavy stockpiling in the final quarter in anticipation of a year-end price rise. While demand for OPEC oil continued to rise sharply through the first half of 1977 as a result of abnormally cold weather and a natural gas shortage in the United States, a downturn is underway as new production from Alaska and the North Sea comes into the market. For the year as a whole, OPEC oil exports should average about 4 percent higher than in 1976.

The two-tier pricing arrangement arrived at by the OPEC ministers at Doha in December 1976 was resolved at mid-year. At that time, Saudi Arabia and the UAE agreed to raise their prices an additional 5 percent, bringing them in line with the majority of OPEC members which had raised prices 10 percent in December. In return, the other eleven members agreed to drop a 5 percent additional increase planned for July. The OPEC ministers were scheduled to meet again in late 1977 to discuss the question of oil prices again.

Merchandise imports by the OPEC group will probably grow by about 21 percent in aggregate value, reaching approximately $83 billion during 1977, due about equally to increases in prices and volume. Individually, import growth rates differ significantly. The Arabian Gulf countries of Saudi Arabia, UAE, and Kuwait as well as Iraq and Libya are increasing their import levels substantially faster than the other OPEC members (12–16 percent in volume). These countries have adopted ambitious development plans and in general do not face serious financial constraints. Even in these countries, however, import growth has declined significantly from the very rapid rates of growth experienced during 1974 and 1975 due to absorptive capacity constraints arising from limited manpower and infrastructure.

For similar reasons, the growth of imports into Iran will be limited to about 3 percent in volume. Deficit countries such as Algeria, Nigeria, Indonesia and Venezuela have continued borrowing externally to finance import volume increases in the 5 to 10 percent range. Ecuador and Qatar have increased imports but little in real terms because of financial constraints in the former case and limited development potential in the latter.

On services account, the increase in the deficit in 1977 will be much more moderate than the increase which took place in 1976 when large increases in expatriate remittances, especially in Saudi Arabia, boosted the services deficit by nearly $5.0 billion. A contributing factor was the slower growth of investment earnings that year due to recession-induced lower oil revenues in 1975.

In 1977, the services deficit should grow by about $2.0 billion as increased payments for freight and insurance on imports, expenditures for management and consulting services, travel and remittances are largely offset by increased earnings on overseas investments. Offsetting this to some extent are the foreign interest payments made by the major debtor countries.

The OPEC surplus is highly concentrated among the low-absorbing countries of the Arabian Gulf. Saudi Arabia accounted for about 43 percent of the total in 1976 and its share is expected to rise to about 55 percent in 1977. Together, the four Arabian Gulf States now account for about 35 percent of the total net OPEC surplus.

TRENDS IN OPEC FINANCIAL FLOWS

The combined current account surplus of OPEC members—on a cash basis—plus gross foreign borrowings by some OPEC members produced an estimated $42 billion of capital available to flow to other countries in 1976. The nature and geographic dispersion of the resultant capital flows continued to reflect the substantial differences in the means and national objectives of the individual OPEC members.

The open, nondiscriminatory capital and securities markets of the United States continued to attract and efficiently handle substantial amounts of OPEC investments. In 1976 OPEC investments in U.S. bank deposits and in the U.S. money market and portfolio securities amounted to $7.8 billion, an increase of $1.5 billion over the level of such investments recorded in 1975. Other OPEC capital flows to the United States (prepayments for U.S. exports, debt amortization and real estate and other direct investments) amounted to over $4 billion. These capital inflows represented nearly 30 percent of all OPEC foreign placements in 1976 (compared with less than 25 percent in 1975).

OPEC financial flows to other areas in 1976 continued at roughly the same or slightly lower levels than in 1975 with the exception of sterling investments in the United Kingdom and foreign currency deposits (presumably dollars) in the Eurobanking market. Foreign currency deposits of about $11 billion were placed with the Eurobanks in 1976 compared with about $8 billion in 1975. Sterling investments by OPEC countries continued to decline in 1976 following a drop in 1975 to only $250 million as against $7.5 billion in 1974. About $1 billion worth of previously accumulated sterling assets in the United Kingdom were disposed of in 1976.

Preliminary estimates for the first half of calendar 1977 investments by OPEC members suggest that an increasing proportion of surplus OPEC funds is being placed in Eurobanking deposits and in countries other than the United States. Net investment in sterling assets in the United Kingdom has resumed and investments in other countries are taking place at significantly higher rates than in previous years.

OPEC member placement of funds in the United States continued to grow during the first half of 1977 but at a slower rate than for other countries. A significant increase in the rate of investment in long-term U.S. debt securities was accompanied by a declining rate of investment in U.S. corporate stocks and a drawdown of prior year deposits in United States banks.

INTERNATIONAL ENERGY POLICIES

United States international energy policy is based on the President's National Energy Plan (NEP) of April 29, 1977. The fundamental objective of the NEP is to minimize the economic consequences of the current international energy situation, in part, through a reduction of U.S. dependence on foreign oil and of U.S. vulnerability to supply interruptions. In the interdependent world economy, this objective can be attained only through continued consultation and cooperation among oil consuming and oil producing countries, both developed and developing.

The United States actively pursued these international policy objectives during the past year in the Energy Commission of the Conference on International Economic Cooperation (CIEC) and in the International Energy Agency (IEA). The CIEC, which included representatives from the developed, developing and oil producing countries, concluded its work in June 1977, and considered a number of energy initiatives in its work program. (The CIEC is discussed in more detail later in this Chapter.)

The IEA was established on November 18, 1974 by nineteen developed oil-consuming countries, in the wake of the 1973 oil embargo, to coordinate energy policies, establish common goals, and institute joint emergency arrangements to ease the effects of possible future supply interruptions. As part of this program an emergency oil allocation system was designed, the efficacy of which was tested during the period October 4 to November 18, 1976. The purpose of this test was to assess the adequacy of the technical calculations, communications, and procedures that would be used in an actual emergency to implement member country oil-sharing programs in a coordinated, fair and orderly manner.

The test demonstrated that the procedures and mechanisms involved in balancing country allocation rights and obligations were essentially sound and workable. However, as might be expected in the first test of such a complex logistical exercise, the need for some improvements was indicated. Steps are now being taken to strengthen the IEA emergency sharing procedures, and further tests are to be conducted to ensure the viability of the allocation system.

The IEA also made some headway during the past year in encouraging energy conservation and stimulating the development of non-OPEC energy supplies through the Long-Term Co-operation Program. Considerable progress was made towards evaluating member country programs for accelerating energy development and enhancing conservation efforts. This is an annual review process conducted to assess the adequacy of member efforts in contributing to the reduced oil dependence objectives of the IEA. In addition, the IEA is moving forward on obtaining agreement with respect to greater utilization and development of non-oil fuel resources (such as steam coal) and discussions have begun on coal-related policy guidelines.

At an IEA Ministerial Meeting in October 1977, a draft Decision on Group Objectives and Principles for Energy Policy was adopted. The basic premise of these objectives is that "in order to maintain equilibrium in energy market conditions, Participating Countries will establish group objectives for the level of their total oil imports in the future, and . . . it will be their objective as a group to hold their total oil imports to not more than 26 million barrels per day in 1985". Without such action, the IEA has estimated that member country oil imports would amount to approximately 36 million barrels per day in 1985.

In the CIEC the industrialized and developing countries agreed that it would be desirable to examine the need for increased investment in energy resource production in the non-oil developing countries. The World Bank was asked to examine this question. As a result of these reviews and other analyses, it is expected that additional emphasis will be given during the coming year to development of measures to encourage increased energy production in these countries. (The role of the U.S. Overseas Private Investment Corporation in this area is discussed in detail in Chapter VI of this Report of the NAC).

WORLD OIL PRICE AND MARKET

Energy prices continued to rise during 1977. While this has not led to the serious disruptions of previous years, it has caused continued economic distortions, reducing economic growth and increasing inflationary tendencies in the developed and developing countries alike. Oil price increases have distorted the pattern of capital investment, as resources have been diverted to develop alternatives to high cost OPEC oil and to replace equipment made obsolete by the relative increase in the price of energy. Since 1973, continually rising oil import costs have seriously constrained the economies of energy deficient developing countries whose oil import bill quadrupled from $3 billion in 1973 to $13 billion in 1976.

Although new sources of oil from areas such as the North Sea, and Mexico are coming onstream, OPEC countries remain dominant in the world oil market. At the OPEC meetings in Doha in December 1976, Saudi Arabia and the United Arab Emirates broke ranks with the other eleven OPEC members on the oil price issue and announced a five percent price increase, while the other members adopted a 10 percent price increase with an additional five percent increase scheduled for July. In order to move the effective price increase toward the five percent level, Saudi Arabia announced increases in production from 8.5 million barrels per day to 11.8 million barrels per day by the end of 1977. During the first half of 1977, however, Saudi production centered around 9.4 million barrels per day (b/d) because of problems created by a pipeline fire.

The July 1977 meeting of OPEC oil Ministers at Stockholm ended the two-tier price structure. The OPEC Eleven agreed to forgo the 5 percent increase scheduled for July and to freeze prices for the remainder of calendar year 1977. Saudi Arabia and the UAE increased prices by 5 percent. The OPEC benchmark reference price for Saudi Arabia light crude was set at $12.70 per barrel. The difficult question of price differentials for various types and qualities of crude is still under discussion.

The world oil market has been expanding since early 1976. For the first half of 1977, total world production increased approximately 7.3 percent as compared with the first half of 1976, rising from 55.2 million b/d to an estimated 59.2 million b/d. Preliminary estimates place 1976 world production at 57.2 million b/d, of which some 53 percent, or 30.5 million b/d, was produced by OPEC members. OPEC production (excluding natural gas liquids) for the first half of calendar 1977, at 31.4 million b/d, represents an 8.75 percent increase over first half of 1976 production of 28.9 million b/d.

INTERNATIONAL DEVELOPMENT AFFAIRS

Relations between the developed and the developing countries assumed new and important dimensions during the period covered by this Report of the NAC, with the Conference on International Economic Cooperation (CIEC) being the major focus. The "dialogue" between the two groups of countries, which had been initiated in 1975 following a period of confrontation, was characterized by a joint willingness to engage in a serious and cooperative search for mutually beneficial solutions to economic problems and for measures to stabilize the international economic system. The United States actively participated and assumed a leadership role in directing this dialogue into constructive channels. To this end, the United States advanced a number of initiatives designed to serve the long-term interests of both developing and developed countries and to promote world economic and financial stability.

Underlying the United States approach in these matters is the recognition that the well-being of the developed countries is intimately linked to that of the developing countries. The goals and aspirations of our societies cannot be fully achieved in isolation and away from trends in the developing countries. Development is, however, a long-term process requiring effective, long-term, resource management by developing countries and the cooperation and assistance of the international community as a whole. For these reasons, the United States has sought to redirect the "North/South dialogue" in the CIEC and in other forums toward an emphasis on improving the existing international system in ways beneficial to both developing and developed countries.

To achieve this objective, the United States has stressed throughout the dialogue the appropriate and efficient transfer of resources to the developing countries through direct mechanisms such as foreign assistance, trade and investment. The United States believes—and has sought to convince the developing countries—that indirect mechanisms such as generalized and automatic debt relief or the indexation of primary product prices are both inefficient tools for the purpose and contrary to the long-term interests of the developing countries.

The Economic Summit meeting in London in May 1977 provided an opportunity for achieving constructive progress in the North/South dialogue. The leaders of the seven major developed countries, seeking a strategy for promoting world economic stability and growth which would benefit the developed and developing countries alike, agreed on measures to promote sustained and non-inflationary growth. They agreed to pursue a number of measures specifically designed to help the developing world. These measures include increased foreign assistance flows (particularly to the poorest countries), support for the multilateral lending institutions, improved access to capital markets, the promotion of secure investment, and productive results from negotiations on commodities.

The commitment of the developed countries at London was reinforced at the CIEC. The CIEC communique clearly outlined the basic areas of agreement and disagreement in the North/South dialogue. In so doing, the communique helped delineate the realistic limits to the demands and commitments of the developed and developing countries. The communique mentioned several concrete benefits for the developed and developing countries—commitments to increase the volume and effectiveness of foreign assistance flows, to assure the availability of adequate official international financial resources and to strengthen the international trading system (in particular by assuring developing countries access to markets in the developed countries)—which reflected the self interests of the developed countries and increased recognition of developing countries' needs. The basic aim of the commitment to negotiate a common fund, the specifics of which would be negotiated elsewhere, is to stabilize commodity prices around long-term trends and thereby reduce risks from inflationary and deflationary pressures for consumers and producers alike.

Other indications of constructive progress at the CIEC included recognition by the oil producing countries that, in shaping supply policies, they bear a particular responsibility for worldwide economic stability. In addition, the non-oil developing countries recognized the importance of private investment flows to the success of their development programs. The CIEC thus witnessed considerable pragmatic recognition of the elements which constitute a favorable investment climate.

With the conclusion of the CIEC, the focus of the dialogue will be changing. While North/South problems will continue to be discussed in the United Nations General Assembly, discussion and negotiation of specific North/South issues will, for the most part, revert to the several specialized international forums. While the CIEC underscored the necessity for cooperation and enhanced the outlook for more cooperative, pragmatic negotiations on particular issues, the challenge in coming months will be to maintain the momentum for continuing cooperation among the developed and the developing countries and to improve the means and institutions used to achieve this end.

The United States continues to seek ways of enhancing cooperative efforts in the evolving North/South dialogue and for promoting and facilitating the development process. In his address to the U.N. General Assembly in March 1977 President Carter pledged that the United States would play an active leadership role in pursuing constructive dialogue and helping to mold an international system based on equity, growth and justice. In the search for more fruitful methods of cooperation, however, traditional approaches to economic development may no longer be sufficient. The President stressed the need for, and the importance of, not only seeking to increase the productive economic capacity of the developing countries but also for devoting more attention to meeting the basic human needs of the people in those countries. A redirection of developed country efforts to meet more effectively the needs of the poorest people in the developing world may be necessary to achieve this. The population which does not have such essential needs as food, water, shelter, health care, employment and education will be the primary target in these efforts.

The United States and other developed countries expressed their commitment to search for better methods of cooperation and to pay increased attention to meeting the basic human needs of the poor in the developing countries at the Ministerial Conference of the Organization for Economic Cooperation and Development (OECD) in Paris in late June 1977. Participants in this Conference endorsed a declaration on relations with the developing countries which embodied such commitments. The establishment of an OECD working group to design a program for meeting basic human needs was also endorsed. The Ministers recognized in this connection that the interests and expertise of the developing countries themselves must also be engaged in these efforts and consultations to identify the types of policy changes which may be required and suggested means for evolutionary progress toward meeting these objectives were encouraged.

Stress on meeting basic human needs is a vital dimension, although only part of the broader strategy of the United States for development. It is designed to complement rather than supplant other important efforts in this area. This concern will, however, become more central to our efforts to create a new relationship with the developing countries and to play a key role in the development process.

Forums for the North/South Dialogue

Three of the several international forums in which development issues were discussed during the period covered by this Report were particularly important. First, as already indicated, the major focus was in the Conference on International Economic Cooperation (CIEC)—an 18-month dialogue on North/South issues—which concluded with a Ministerial meeting in June 1977. The second significant forum was the Joint Ministerial Committee of the Board of Governors of the IBRD (World Bank) and the IMF on the Transfer of Real Resources to Developing Countries—the Development Committee—which held four meetings during the period. A third forum was the Third United Nations Law of the Sea Conference which took place in New York between May 23 and July 15, 1977.

Conference on International Economic Cooperation (CIEC): The Conference on International Economic Cooperation (CIEC) was established at a Ministerial meeting in Paris in December 1975. The objective of the CIEC, which comprised representatives from the developed countries, the non-oil developing countries and OPEC members, was "to initiate an intensified international dialogue on the international economic situation, to address problems and to further international economic cooperation for the benefit of all countries and peoples".

The 27 participants in the CIEC included seven developed countries (Australia, Canada, Japan, Spain, Sweden, Switzerland and the United States) plus the European Economic Community (EC), and 19 developing countries, (Algeria, Indonesia, Iran, Iraq, Nigeria, Saudi Arabia, Venezuela, Argentina, Brazil, Cameroon, Egypt, India, Jamaica, Mexico, Pakistan, Peru, Yugoslavia, Zaire and Zambia.)

Discussions took place in four separate commissions: the Energy Commission, the Raw Materials Commission, the Commission on Development, and the Commission on Financial Affairs. Each Commission consisted of 15 CIEC members, five from among the developed country participants and ten from the developing country participants. The CIEC had two cochairmen as did each commission. (Further details on the organization and operation of the CIEC may be found in the 1976 *Annual Report* of the National Advisory Council, House Document 95–67, 95th Congress, First Session.)

The Conference proceeded in two stages. The first 6 months were devoted to an exhaustive analytical examination of North/South economic issues. This was followed by a second stage during which the conclusions of the Conference were negotiated. The Conference concluded with a Ministerial meeting on June 3, 1977. The final communique, adopted by consensus, cited agreement by the 27 CIEC participants on a large number of issues relating to energy, raw materials, development and finance. It also took note of the main issues on which the developed and the developing countries were unable to reach agreement. The communique reflected agreement by all participants on the usefulness of the CIEC discussions and on the CIEC's contribution to increased understanding of the international economic situation.

The impact of the CIEC on the North/South dialogue cannot now be fully assessed, although it certainly appears to have contributed to a broader understanding of the international economic and financial situation and to an increased sense of realism on the part of both the developed and the developing countries. The CIEC was, however, only one aspect of the ongoing, evolving, dialogue in search of solutions to problems to the mutual benefit of the developed and developing countries. In addition, the CIEC should promote more focused discussion on individual issues in the specialized forums.

The following paragraphs summarize briefly the major final decision of the CIEC in the four areas of energy, raw materials, development and finance.

With respect to *energy*, the CIEC participants agreed to a set of general guidelines that: (a) recognize the essentiality of adequate and stable energy supplies to world-wide growth and the responsibilities of all countries to ensure that such supplies are available; (b) call for intensified national and international cooperation in efforts to expand energy conservation and accelerate the development of conventional and non-conventional energy supplies during the energy transition period and beyond; (c) affirm that special efforts should be made to assist in alleviating the energy burdens of the oil importing developing countries; (d) recommend that the World Bank, in the context of a general capital increase, give priority to lending for energy development in the developing countries; (e) call for new international efforts to facilitate the transfer of energy technology to developing countries which seek to acquire such technologies; (f) endorse enhanced international cooperation in energy research and development; and (g) recognize the desirability and inevitability of the integration of the downstream processing industries of the oil exporting countries into the expanding world industrial structure as rapidly as practicable. In sum, progress was made at the CIEC on all of the basic developed country energy objectives with the notable exception of obtaining a CIEC recommendation for an on-going energy dialogue.

The objectives of the developed countries in the *raw materials* area at the CIEC consisted of ensuring a pragmatic and objective treatment of commodity trade problems as well as possible solutions to these problems. There were general areas of agreement but larger areas of disagreement, particularly on such traditional developing country objectives as indexation of prices and measures to harmonize the production of synthetics with natural products. The CIEC participants reached an agreement in principle on the establishment of a common fund, the purposes, objectives and other constituent elements of which are to be negotiated subsequently. (See Chapter V of this Report for further details.)

Agreement was reached at the CIEC *Development* Commission on a number of useful concepts and programs in the areas of development finance, the transfer of technology, trade, assistance to agriculture, infrastructure and industrialization. These included: (a) a commitment by donor countries to seek increases in official development assistance and to improve the quality and distribution of foreign assistance flows; (b) agreement to commence negotiations on a general capital increase of the World Bank; (c) agreement to establish a special action program of $1 billion in additional foreign assistance for the poorer developing countries; (d) agreement on a series of general concepts relating to infrastructure development, with particular reference to a U.N. sponsored conference to help define Africa's infrastructure needs and ways to mobilize efforts to ameliorate these needs, especially in the transportation and communications area; and (e) agreement on a 500,000 ton emergency grain reserve, support for early negotiation of a grains agreement with stocks, and recommendations for enhanced assistance for food production and research. On the subject of *trade*, the CIEC participants agreed to: (a) recognize the importance of making general progress in the Multilateral Tariff Negotiations (MTN); (b) call for efforts to improve the Generalized System of Preferences (GSP); and (c) reach an early conclusion to the multilateral textile negotiations.

Participants discussed, but could not agree on, the problem of developing country external indebtedness. The United States and the EC tabled a proposal (which was not accepted) that distinguished between features to guide solutions of acute debt situations and situations where growing external debt is part of a longer-term structural balance of payments problem. The developing countries position stressed generalized and automatic relief from external debt.

Attention in the *Financial Affairs* Commission of the CIEC was concentrated on four main topics: private foreign direct investment, developing country access to capital markets, other financial flows including monetary issues, and measures to enhance economic cooperation among the developing countries. With respect to private direct foreign investment, considerable progress was made in agreeing on the elements essential to a favorable investment climate, although individual issues touching on the sovereignty of host countries were not resolved. On the question of access to capital markets, the CIEC participants supported the work of the IBRD/IMF Development Committee (see below) and urged speedy implementation of its recommendations. On monetary issues, participants noted that the work program laid out for the IMF by the Interim Committee reflected a large number of concerns brought out during the conference and support was expressed for the initiative to establish a supplementary credit facility in the IMF. (Discussed in Chapter III of this Report.)

IBRD/IMF Development Committee: The IBRD/IMF Development Committee was established in October 1974 to maintain an overview of the development process and to consider all aspects of the broad question of the transfer of real resources to the developing countries. When the Committee was established by the Governors of the World Bank and the IMF, it was with the understanding that the performance of the Committee would be reviewed at the end of its second year. (The creation of the Development Committee and details on its earlier meetings are discussed in the last two *Annual Reports* of the NAC).

The sixth meeting of the Development Committee was held in Manila on October 3, 1976 in conjunction with the joint annual meetings of the World Bank and the International Monetary Fund. An important item on the agenda was a report by the Executive Directors of the Bank and the Fund on the performance of the Committee. While noting a number of problems during its first 2 years, there was general agreement that the Development Committee was a useful forum for the discussion of issues relating to the transfer of real resources and at the joint annual meeting, the Governors of the Bank and the Fund passed parallel resolutions extending the Committee for another 2 years without any change in its mandate.

The most significant action taken by the Committee at the sixth meeting was a decision to establish a second working group: the Working Group on Development Finance and Policy. At the initiative of the United States, the Committee agreed that this new working group should consider a study of the proposed International Resources Bank to be prepared by the World Bank. Other subjects to which the Committee assigned high priority were the volume, terms and distribution of official foreign assistance flows and the resources situation of the international development lending institutions (IDLIs).

The Development Committee also received a further report from its Working Group on Access to Capital Markets. It endorsed the recommendations of this Group relating to the removal of legal and administrative barriers to developing country access to capital markets, technical assistance activities in this field, and co-financing between the IDLIs and private lenders.

(The seventh meeting of the Committee was held on October 6 in Manila for the purpose of electing a new Chairman and appointing a new Executive Secretary. Cesar Virata, Secretary of Finance of the Philippines, was elected Chairman and Sir Richard King of the United Kingdom was appointed Executive Secretary.)

The eighth meeting of the Development Committee was held on April 27, 1977 in Washington, D.C. Coming only a month before the conclusion of the CIEC and shortly after the formation of new governments in several member countries, and with new leadership, the eighth meeting was more an opportunity for reflection and discussion of general positions than for action. The principal substantive items on the Committee's agenda were reports from the two Working Groups. In connection with the report of the Working Group on Access to Capital Markets, the Committee discussed multilateral guarantees and the proposed International Investment Trust. The Committee also accepted a recommendation from this Working Group to call on all governments to cooperate in the process of improving the collection, processing and dissemination of information on international financial stocks and flows.

With regard to the report of the Working Group on Development Finance and Policy, the Committee agreed that the Group should examine the International Resources Bank, procedures for replenishment of the resources of the IDLIs, the distribution, terms and quality of official development assistance (ODA), and the effectiveness of foreign assistance in promoting development. The policy of the new Administration toward the Development Committee was set forth in remarks made by the Secretary of the Treasury who noted the new Administration's commitment to promote the process of economic development throughout the world, and expressed the view that the Development Committee had the potential for playing an important role in the years ahead in discussing the most pressing economic issues between the developed and developing countries.

The ninth meeting of the Committee was held on September 25, 1977 in Washington, D.C., in conjunction with the 1977 annual meetings of the World Bank and the International Monetary Fund. The major accomplishment at this session was agreement on a program of work. Committee members agreed to continue ongoing work on two subjects: (a) issues related to official development assistance and (b) issues related to developing country access to capital markets. With respect to the latter subject, the members agreed to examine the role of borrowing in development. In addition to this, the Committee agreed to pursue four new subjects: (a) a report on world development issues to be prepared during the coming year by the World Bank; (b) coordination of the lending programs and the replenishment of the IDLIs; (c) the stabilization of export earnings of developing countries; and (d) the role of private direct foreign investment in the development process.

At this meeting, the Committee also endorsed recommendations contained in reports from its two Working Groups. In connection with the report of the Working Group on Access to Capital Markets, four recommendations in particular were endorsed: (a) that the IFC test the feasibility of a promotion program for bond issues of selected developing countries; (b) that the IBRD and other development banks consider requests from member countries for guarantees of bond issues in full or partial substitution for direct project loans; (c) that the IFC undertake a simulation of operations and results of international portfolio investment such as might be done by an International Investment Trust; and (d) that progress reports on the elimination or reduction of barriers and restrictions in capital-exporting countries to borrowing by developing countries in their capital markets be discussed.

In connection with the report of the Working Group on Development Finance and Policy, the Committee agreed with the conclusion that the establishment of an International Resources Bank was not feasible or generally desirable. The Committee also agreed that the creation of a consultative group for energy resources development was not necessary. At the same time, considerable interest was expressed in the general area of mineral and energy resources. The subject of volume, terms, and distribution of official development assistance was discussed, and the Committee in particular welcomed steps to be taken to provide better information on aid flows from OPEC countries.

A procedural innovation of consequence was also adopted in September 1977 at a meeting of Development Committee Deputies held on September 15 in Paris. The Deputies discussed the future work program and other matters on the agenda for the September 25 Committee meeting. The Deputies were able to resolve a number of difficult issues that enabled the Committee to reach agreement on the work program and other matters without extensive or difficult debate. There was also general agreement among the members to continue the Deputies Group of the Committee.

Law of the Sea Conference: The sixth session of the Third United Nations Conference on the Law of the Sea met in New York from May 23 to July 15, 1977. In accordance with a decision made at the fifth session of the Conference, the first 3 weeks of the sixth session were devoted to discussions of deep seabed mining, with the work being coordinated by Minister Jens Evensen of Norway, whose earlier texts on such major issues as the system of exploitation and the system of governance of the proposed International Seabed Authority were widely viewed among developing and developed countries as sound bases for further negotiation.

After the first 3 weeks, the Conference resumed work on other matters, including the legal status of the coastal state 200-mile Exclusive Economic Zone and the high seas freedoms of other States in the Zone.

In general, significant progress was made at the sixth session toward drafting a compromise formulation which would be generally acceptable to most countries. The deep ocean mining negotiations have, however, remained deadlocked. United States concerns with the lack of progress and the inequitable negotiating process have reached the point where the question of our continued participation in the Conference has come under review. At stake is access to extensive deposits of manganese nodules (which contain significant quantities of manganese, cobalt, nickel, and copper) and other seabed resources which may be discovered in the future.

The basic position of the United States has been to ensure that the proposed treaty provides assured access for private companies and State-operated enterprises after certain objective criteria with regard to safety, pollution, and work requirements have been satisfied. The major developed countries, some of which are currently cooperating with American firms in consortia, have supported this concept. On the other hand, the G–77 countries have supported a program of discretionary access to these resources, controlled by the proposed International Seabed Authority.

At the September 1976 session of the Law of the Sea Conference the United States initiated a proposal designed to reconcile these divergent viewpoints. In exchange for G–77 agreement to an assured access system, the United States would support a plan for financing the Enterprise (the operating arm of the Authority) and enable it to begin operations within the same time frame as private firms and States. A "parallel" system of exploitation along these lines could meet the basic requirements of the developed countries for assured access and of the developing countries for direct participation in the exploitation of seabed resources.

Despite the progress made on this issue by Minister Evensen, certain members of the G–77 and the ocean mining committee drafted a text (about which the United States was not consulted) which largely ignored the previous progress toward a compromise text. The United States objects to this procedure and to provisions of the draft text which would *inter alia:* (a) give the Authority and its one-country one-vote Council discretionary power to require a transfer of technology to the Authority in return for a mining contract; (b) set an artificial limit on seabed production to protect land-based producers; and (c) fail to specify the financial burden on the firms of any revenue sharing scheme.

The negotiations on deep ocean mining have serious implications for overall natural resource and development finance policies. The position of the United States in favor of assured access to deep ocean resources is based on a desire to encourage an efficient increase in the output of important natural resources and to minimize controls over investment, production and prices.

In these negotiations the United States has upheld the principle that there should be revenue sharing between the ocean miners and the international community. These revenues would be a source of development finance and compensatory adjustment assistance for developing country land-based minerals producers if these producers were seriously affected by seabed production.

Issues in the North/South Dialogue

Commodity Issues: Commodities constitute a substantial share of exports for many developing countries.

The developing countries have long sought to improve and stabilize commodity export earnings and for this purpose have proposed mechanisms such as improved market access, commodity agreements, and various types of international financial arrangements. Their interest in commodity agreements has been growing for a number of years—an interest which has intensified as a result of the acute balance of payments difficulties encountered by many developing countries following the oil price increases and the subsequent worldwide recession. The extreme price volatility in world commodity markets during the period 1973 to 1975 also served to focus the attention of both developed and developing countries on the possible benefits of increased market stability by means of international commodity agreements. (Also see Chapter V of this Report.)

The new Administration has adopted a positive and open attitude toward the negotiation of individual *commodity agreements* to stabilize prices around market trends. Such stability would not only contribute to worldwide economic development but should also help reduce inflationary pressures at home. The Administration is seeking to use existing national and international institutions to expand world production of raw materials to reduce the likelihood of shortages in the future as well as to promote overseas development through investment in raw material production projects. The new Administration has also indicated its willingness to study further actions for promoting stability in the foreign exchange earnings of developing countries which are heavily dependent on exports of primary products.

The *UNCTAD Integrated Program for Commodities* adopted at Nairobi in May 1976 calls for the completion of preparatory meetings on fourteen of eighteen listed commodities by February 1978 and for the convening of negotiating conferences for commodity agreements where appropriate by the end of the year. As of July 31, 1977, preparatory meetings had been held on copper, rubber, manganese, jute, hard fibers, edible oils and oil seeds, tropical timber, and cotton. The first session of a negotiating conference on a sugar agreement was held in May. It had become clear, however, that several preparatory meetings will be needed for each of the commodities, especially for those for which commodity agreements may be possible, and consequently the convening of negotiating conferences on more than a limited number of these commodities before the end of 1978 would appear to be unlikely.

The Fifth *International Tin Agreement* (ITA), currently the only active agreement for non-fuel minerals, came into force on July 1, 1976 and for the first time the United States was a participant. The ITA operates a buffer stock to stabilize tin prices and provides a forum for the collection of data on the tin industry and markets and for the discussion on issues of concern to tin producers and consumers. The United States expects its participation in the ITA will lead to a more viable agreement which can provide benefits for both producers and consumers. The United States also participates in the *International Coffee Agreement* (ICA) and is an active participant in negotiations for an *International Sugar Agreement* (ISA). The United States is not, however, a member of the International Cocoa Agreement.

A common fund, initially proposed by the UNCTAD Secretariat in late 1974, is the centerpiece of the UNCTAD Integrated Program for Commodities. As envisioned by UNCTAD, it would have resources of $6 billion which would serve as a catalyst in negotiations of commodity agreements for at least ten commodities. It would be used to finance buffer stock operations and other measures, and would intervene in markets to buy commodities not covered by commodity agreements.

The United States has opposed the UNCTAD version of the common fund because it would encourage the creation of commodity agreements in order to obtain access to fund resources. The United States position is that resources for buffer stocks should be raised by commodity agreements themselves to discourage uneconomic agreements that might lead to the disruption of commodity markets. With regard to non-buffer stock measures, such as loans to improve competitiveness, the United States view has been that these could be financed more efficiently by the existing IDLIs.

Following the common fund negotiating conference at Geneva in March 1977, the United States began to develop principles for a common funding arrangement that it and other major developed countries could support. These principles include financial viability; limitation of activities to buffer stocks; exclusive authority for each agreement over all economic interventions in international markets for that commodity; and facilitation of financing by providing savings compared to separately financed agreements. The developed countries were scheduled to present a concrete alternative proposal for a common fund at the next negotiating conference to be held late in 1977 in Geneva.

The LDCs have pressed hard for the *maintenance of commodity earnings purchasing power* through mechanisms to index commodity export prices to the prices of imported manufactured goods. This was a major element of their position in the Commission on Raw Materials at the CIEC during 1976 and 1977. The United States and other developed countries resisted this initiative, however, on the grounds that indexation, or other arrangements, to maintain parity of prices would lead to market disruption, misallocations of resources, and long-term deterioration of the economic welfare of both developing and developed countries.

The dependence of many developing countries on only a few commodities has, nonetheless, made their export earnings extremely sensitive to the changing phases of the business cycle in developed countries. In 1963 the International Monetary Fund created a *Compensatory Financing Facility* (CFF) to provide relief to IMF member countries, mainly the commodity exporting countries, when there has been a temporary shortfall in export earnings for reasons primarily beyond the member's control. A subsequent IMF decision in December 1975 substantially increased the amount a member country could draw under this facility. The developing countries were quick to utilize the increased access to IMF resources under this decision and drawings under the CFF rose dramatically over the past 2 fiscal years.

The developing countries have frequently proposed that the CFF be further liberalized so as to provide resources on a concessional basis during periods of weak demand for commodity exports. The United States and other developed countries have maintained that the IMF should not become an instrument of foreign assistance and have strongly opposed such liberalization. At the London Economic Summit meeting in May 1977, the participants agreed that they "should work to . . . consider problems of the *stabilization of export earnings of developing countries.*" While there was discussion at the CIEC of an international study on export earnings stabilization for developing countries, CIEC participants could not agree on the terms of reference for such a study or which international organization would undertake the task.

Trade: Although *trade issues* appeared to be somewhat less in the forefront than the more controversial debates on commodity policy and debt relief, developing countries continued to press for improvements in, and the permanency of, preferential tariff systems for developing countries, and for progress in the MTN with respect to special and differential treatment for the developing countries.

In the CIEC and in various UNCTAD and UN forums, these countries urged that the generalized systems of preferences (GSP) now granted by all developed countries be made permanent. They also called for the lifting of current restrictions on eligibility and the expansion of product coverage. The final CIEC communique states that the developed countries should continue their generalized systems of preferences beyond the original ten-year period (ending in 1980) envisioned in the GATT (the legal authority for the GSP of the United States extends to 1985, and hence already meets this commitment) and to make efforts to liberalize the system.

The issue of special and differential treatment for the developing countries was essentially referred back to the MTN by the CIEC—the CIEC communique simply urges that the MTN should make substantive progress in 1977, with particular attention to special and differential treatment for developing countries. Specifics from developing countries on the forms such treatment might take were not included in the final CIEC document.

Under the circumstances, the principal discussions on trade issues in the near future will center in the MTN. Negotiators will need to find a balance between the desires of the developing countries for special advantages in the world trading system and the concerns of the developed countries, including the United States, that any such special and differential treatment not be at the expense of progress in the overall liberalization of the world trading system. The United States is convinced that over the long run all countries, including the developing countries, will benefit more from generally liberalized trade than from differential treatment. Furthermore, the United States will insist that any special treatment granted be phased out as the developing countries become more competitive on world markets. As they are able, the developing countries should steadily undertake more of the usual obligations associated with membership in the GATT and the world trading system.

Investment, Multinational Corporations, and Transfer of Technology: During the past few years, the developing and developed countries have generally been at odds on investment-related issues, in part because of demands by the former in connection with their program for creating a "New International Economic Order." The investment provisions of this program are generally based on the principles that: (a) each State may nationalize foreign property without regard to the standards of international law and (b) a host country may regulate the activities of multinational corporations (MNCs) operating in its territory and home countries are obliged to assist other States in exercising this right. To implement these principles the developing countries have pressed for a mandatory and comprehensive code of conduct for MNCs and a mandatory code to regulate the terms and conditions for the international transfer of technology.

The United States and other developed countries have agreed to participate in negotiations on such codes but have insisted that they be voluntary in nature. The U.S. view is that such codes could be useful as a means of defusing potential misunderstandings between host countries and investors and thus facilitate the capital flows needed for the growth and progress of the developing countries. At the same time, the U.S. has continued to hold—both in the various multilateral code negotiations and in our bilateral relations—that an expropriating government should observe its obligations under international law. (Further details on these issues are contained in Chapter VI of this Report.)

Resource Transfers: The new Administration's initial review of development policy concluded that the United States has vital economic, political, security and humanitarian interests in the developing countries. These countries are likely to play a major role in efforts to find global solutions to the problems of world hunger, population growth, energy shortages, resource depletion, nuclear weapons proliferation, and numerous other difficulties of universal concern. In its review, the Administration noted that U.S. foreign assistance had declined progressively both as a share of GNP and in real terms over the past 25 years and concluded that the United States could make a more significant contribution in this regard. Consequently, the United States joined the other developed country donors in the London Economic Summit declaration and in the CIEC final resolution to pledge a *substantial increase in assistance to the developing countries.* This commitment explicitly recognizes that foreign assistance is the most direct and effective way of transferring resources for development, while minimizing any distortive effects on the efficient global allocation of resources.

When the President agreed to a substantial increase in U.S. foreign economic assistance, he also called for a review of all forms of foreign assistance—bilateral, multilateral, and food aid—with the objective of determining how this assistance could be made more effective. This review noted that if appropriate policies are implemented by developing countries foreign assistance can make an important contribution. It can also help recipients adopt reforms by cushioning the effect of policy changes on adversely affected groups. Foreign assistance cannot, on the other hand, substitute for adequate domestic measures by the developing countries and will have little lasting benefit in the absence of sound development policies.

In assessing and directing U.S. foreign assistance, the new Administration has given highest priority to reaching the poor. This emphasis is consistent with the legislative guidance for the bilateral development program as expressed in the 1973 and subsequent amendments to the Foreign Assistance Act. The Agency for International Development (AID), which administers U.S. bilateral economic assistance, has redirected its programs in an attempt to reach the poor more directly than in the past. Projects to raise small farmer incomes and increase food production, provide low-cost health and family planning services, and introduce non-formal education have become central in the program. The new Administration has endorsed this effort to address the basic human needs of people in developing countries helping them to increase their productivity and incomes so they can, in the longer term, meet their own needs without concessional aid.

Additional Congressional support for this emphasis on reaching the poor is contained in amendments to U.S. food aid legislation (P.L. 480) which set a minimum tonnage (1.5 million tons for fiscal year 1978) for grant humanitarian programs and require that 75 percent of the food under the concessional sales program be for countries with an annual per capita income of $550 (equivalent) or lower.

The multilateral assistance programs to which the United States contributes complement the bilateral foreign assistance program. Through their "soft loan" windows in particular, the World Bank and the regional development banks (Inter-American Development Bank and the Asian Development Bank) have funded in recent years more projects to assist the poor directly. The IDLIs also continue to play important roles in financing basic physical infrastructure projects, essential to development in the poorer countries.

Debt: The developing countries have continued to press for relief from their external debt-servicing obligations, even though the combined current-account deficit of the non-oil developing countries declined in 1976 and 1977, and the growth of output and trade substantially increased the capacity of these countries, as a group, to service such debts. It might also be noted that inflation has further reduced the real burden of past debts.

In several international forums the developing countries have opted to place emphasis on obtaining immediate and generalized debt relief—essentially as a means of obtaining additional development assistance. The traditional "creditor clubs" which examine individual cases of default or imminent default have been criticized as inadequate and inequitable.

Debt relief was a major issue in the CIEC discussions. The developing countries, represented by the G–19, proposed "an extraordinary and one-shot operation" of debt relief, in which the official external debts of the poorest developing countries would be cancelled, other developing countries would receive concessional debt relief, and the commercial debts of interested developing countries would be consolidated and rescheduled over a period of at least 25 years. The G–19 scheme also called for reorientation of existing international mechanisms for dealing with debt relief (the creditor clubs) and official development assistance. The principles, procedures, and guidelines which the G–19 countries proposed to achieve in this reorientation included: (a) no debtor country responsibility for taking measures to prevent or correct debt-servicing or other financial problems; (b) a prior commitment by creditor countries to "contribute the necessary resources" whenever a developing country requests debt relief; and (c) identification of debt relief as a means of increasing aid flows.

The United States and other major creditor countries have strongly resisted such demands for generalized debt relief. In the CIEC, the United States and the European Economic Community jointly countered the G–19 proposals with proposals for improving the operation of the creditor clubs and enabling an individual developing country to initiate international consideration and appropriate treatment of its long-term external financial problems, if that country believes these problems unduly constrain its development prospects. The U.S./EC proposals, presented as a practical response to the immediate and longer-term financial problems encountered by some of the developing countries, were rejected by the G–19 as inadequate; and, as a consequence, no agreement on the debt issue was reached by the CIEC.

In sum, at these meetings, there remained major divergencies among the groups both as to the nature of the debt problem and on the merits of the various proposals which had been tabled. The developing countries stressed that immediate and generalized debt relief was the most appropriate solution to their debt "problem". The United States and other major developed countries maintained that the approach taken in the paper submitted by the United States and the European Community at CIEC was a practical and realistic response to the current debt situation. The substantive differences on the debt issue remain large and it is not clear to what extent the Ministerial meeting scheduled for early spring 1978 will serve to resolve them. (Further details on United States policy regarding debt relief are contained in Chapter VII of this Report of the NAC.)

Energy: In the energy area, the key issues in the North/South dialogue center on price, supply and technical and financial cooperation. There is also a question of establishing an appropriate means of continuing a post-CIEC energy dialogue. The demands of the developing countries include indexation of oil export revenues and increased resource transfers to the energy-deficient developing countries to help meet oil import bills and to assist in developing indigenous energy resources. Increased financial, scientific and technological cooperation in conventional and non-conventional energy areas also continues to receive considerable attention.

The United States has called for international cooperation to effectuate an orderly and smooth transition to the period of global energy use when there would be increased reliance on sources other than oil and gas. The developed countries recognize the importance of oil prices to all countries and seek to achieve energy prices that are fair to both producers and consumers. OPEC members have pushed strongly to maintain the purchasing power of their oil export earnings, calling for indexation of oil prices, transfers of real resources to the developing countries, and substantial revisions of pricing policies.

The developed countries seek to intensify cooperation in energy research and development programs with special attention to technologies appropriate for developing countries and have proposed specific initiatives in this area. The United States developed an energy investment proposal which recognizes the importance of capital in energy development in the developing countries, the role of the private sector, and the need to improve access to capital markets. The degree and nature of a possible enhancement of the energy assistance role of international financial institutions is also being carefully weighed by the United States.

III. INTERNATIONAL MONETARY AFFAIRS

- Although recourse to IMF financing increased substantially during the past few years as a consequence of world balance of payments developments, the pace of utilization slowed in 1977 and a larger share of IMF credit related to the use of the IMF's more conditional lending arrangements. This trend reflected, *inter alia,* successful stabilization efforts in some countries which reduced official financing needs and, in some cases, permitted early repayment of previous borrowings, improved commodity prices that curtailed use of the Compensatory Financing Facility and the cessation of new lending by the IMF Temporary Oil Facility in early 1976.

- World balance of payments financing needs are expected to be substantial over the next few years and, if adequate financing is not available, some countries may be forced to impose unduly restrictive domestic deflationary measures or to resort to protectionist measures which could be disruptive to global economic stability and undermine the open trade and payments system. In order to deal with this critical need for ensuring that official financial resources are available in sufficient quantity to promote orderly adjustment and to instill private markets with needed confidence, the IMF Board of Governors concluded, in April 1977, that there was "an urgent need for a supplementary arrangement of a temporary nature that would enable the Fund to expand its financial assistance to those of its members that in the next several years will face payments imbalances that are large in relation to their economies." In August 1977 an agreement was reached on the basic terms and conditions of the supplementary (about $10 billion) financing to be provided and in September 1977 legislation authorizing United States participation in an amount not to exceed the dollar equivalent of SDR 1,450 million (about $1.7 billion) was submitted to the Congress and hearings were underway in the relevant Senate and House committees as fiscal year 1977 ended.

- Legislation authorizing the United States to accept the amendments to the IMF Articles of Agreement was signed by the President on October 19, 1976 and on November 15, 1976 the United States formally accepted the proposed Second Amendment to the IMF Articles of Agreement and consented to an increase of SDR 1,705 million in the United States quota in the IMF.

- During the period covered by this Report of the NAC major attention in the foreign exchange markets shifted gradually from the critical stabilization problems faced by certain major developed countries encountering large payments deficits (especially Britain, France, and Italy) to the problems posed by countries experiencing large payments surpluses (especially Germany and Japan). The implications of the growing trade deficit of the United States also became an increasingly important market factor during this period.

- Exchange rate movements continued to reflect divergent economic and financial developments—in terms of the dollar, between July 1, 1976 and September 30, 1977 the Japanese yen appreciated by about 13 percent, the German mark by about 11.5 percent, and the Swiss franc by about 5 percent. Among the currencies which depreciated in terms of the dollar, the Canadian dollar declined by about 10 percent, the Italian lira by 5 percent, the French franc by 3 percent, and U.K. sterling by a little more than 2 percent. On a tradeweighted basis in terms of OECD currencies, the dollar appreciated by about 1.25 percent over the period.

MEETING OFFICIAL FINANCING NEEDS

Since 1973 world payments patterns have undergone profound changes as a result of massive increases in oil prices, unprecedented and persistent inflation, and deep recession followed by hesitant economic growth. These dramatic alterations in the pattern of payments have created major strains on the international financial system.

In the period immediately following the oil price increases of 1973 and 1974, major emphasis was placed on financing the current account deficits which were the inevitable counterpart of OPEC member surpluses. The greatly increased global need for balance of payments financing was largely satisfied by the private market. The International Monetary Fund—the primary source of official balance of payments financing—has also been channeling financing to its member countries at record levels since 1973 although its financing has remained relatively small (as compared to the amounts provided through the private markets), meeting approximately seven percent of total balance of payments financing needs.

Many countries, in responding to the oil price increases, took steps to alter economic policies in order to place their external accounts in more sustainable positions. This adjustment process is far from complete, however, and it must be expected that large payments imbalances will persist over the next several years. For many countries, needed adjustments will not be affected easily, and will have to be pursued over a period of a few years so that satisfactory levels of growth and employment can be maintained. To help ensure that adjustment occurs at an appropriate pace, and with appropriate policies, substantial financing will continue to be needed by the deficit countries. The private markets can and should provide the bulk of this financing, but cannot be expected to handle all of the situations which may arise.

ROLE OF THE INTERNATIONAL MONETARY FUND (IMF)

It is important that adequate official financing be made available, on appropriate terms and conditions, particularly in cases where the need for adjustment is evident but the willingness or ability to pursue needed policies is lacking. The IMF is the primary official source of "conditional" financing, i.e., financing keyed to the adoption by the borrower of sound adjustment policies designed to eliminate the need for such financing and to provide the basis for repayment. The IMF has a good record and its reputation is strong, both with borrowers and creditors. The IMF seeks to ensure that needed adjustment is pursued—in a cooperative and internationally appropriate manner—by countries facing balance of payments difficulties.

Adequacy and Use of IMF Resources

Recourse to IMF financing has increased substantially over the last few years as a consequence of developments in the world balance of payments situation. In fiscal year 1977 the pace slowed and a larger share of IMF credit reflected use of the Fund's more conditional lending arrangements. This trend reflected several factors including: the successful stabilization efforts in some countries that reduced official financing requirements and in some cases permitted early repayment of previous loans; an improvement in commodity prices that curbed use of the Compensatory Financing Facility; and the cessation of new lending by the Temporary Oil Facility in early 1976.

At the end of fiscal year 1977 IMF holdings of usable currencies were at levels low both by historical standards and in relation to potential balance of payments needs over the next few years. IMF holdings of "usable" currencies (currencies of countries considered to be in a strong enough external position for their currencies to be used by the IMF in extending credit to other members) amounted to the equivalent of SDR 4 to 5 billion (roughly $4.5 to $5.5 billion). It is expected that usable IMF resources will increase by about 5 to 6 billion SDR (about $6 to $7 billion) when the quota increases agreed upon under the Sixth General Review of Quotas take effect. In addition, SDR 2.6 billion ($3 billion) of uncommitted resources remains under the General Arrangements to Borrow (GAB) to finance lending to G–10 countries. The IMF can expect to accrue modest amounts of additional usable resources through its monthly gold sales program and through repayments of earlier drawings. A further (Seventh) review of IMF quotas is also now underway, although it is not anticipated that any increase in quotas which may be agreed upon in this review could take effect until late 1979.

Proposals to Expand IMF Resources

As already suggested, balance of payments financing needs over the next few years are anticipated to be substantial. Countries with financing problems will need to make major efforts in the near future to reduce fundamental imbalances within their economies and to restore their external accounts to sustainable positions. External financing needs in some cases may exceed the willingness of the private market to provide funds. If adequate financing is not available, some countries may feel compelled to impose unduly restrictive domestic deflationary measures or to resort to protectionist measures which would be disruptive for the world economy and undermine the open trade and payments system. Thus, there is a critical need to ensure that official financial resources are available in sufficient quantity to promote orderly adjustment and to instill the private market with the confidence necessary to enable it to continue playing a vital financing role.

Supplementary Financing Facility: At its April 1977 meeting, the Interim Committee of the IMF Board of Governors concluded that there was "an urgent need for a supplementary arrangement of a temporary nature that would enable the Fund to expand its financial assistance to those of its members that in the next several years will face payments imbalances that are large in relation to their economies." Following further consideration of this topic by the IMF Executive Board, IMF Managing Director Johannes Witteveen approached a number of industrial and oil exporting countries in strong financial positions to discuss the possibility of providing additional resources to the IMF on a temporary basis. After extensive negotiations, a meeting of potential participants was held in Paris on August 6, 1977 and an agreement was reached on the basic terms and conditions of the supplementary financing to be provided. Initial financing commitments of SDR 8.4 billion (subsequently increased to SDR 8.6 billion, or about $10 billion) were obtained. On August 29, 1977 the IMF Executive Board completed its work on the operating details of this new IMF facility.

The rationale for the new IMF facility rests on three main premises: (a) large payments imbalances will continue over the next several years; (b) there is a need for emphasis on "adjustment" of imbalances, rather than simply "financing" imbalances; and (c) the resources of the IMF must be adequate not only to enable it to foster responsible adjustment policies by member countries facing severe payments difficulties, but also to provide confidence more generally that it is in a position to deal with such problems as may arise.

The purpose of the new facility is to provide supplementary IMF financing to members that face serious balance of payments financing needs larger than their access to regular IMF resources and which are prepared to adopt appropriate corrective economic and financial policies. The supplementary facility is to be temporary, enabling the IMF to draw on the financing commitments of participants over the next several years so as to provide additional financing to members on a strictly conditional basis. Creditors to the facility will receive interest equal to the yield on U.S. Treasury securities of comparable maturity, rounded up to the nearest one-eighth of one percent. Borrowing members will have access to resources under the facility in amounts greater than would be available under the Fund's regular tranche facilities, and will be able to draw on the facility over a period longer than the 1 year normally applicable to IMF stand-by arrangements. The period of repayment will also be longer than the usual IMF standard of 3 to 5 years.

The facility will not enter into operation until a total of SDR 7.75 billion (about $9 billion) has been effectively made available to the IMF, including at least six participants each of which provides not less than SDR 500 million. The United States is the only major participant requiring legislative authorization to participate in the new facility. On September 16, 1977, legislation authorizing United States participation in an amount not to exceed the dollar equivalent of SDR 1,450 million (about $1.7 billion) was submitted to the Congress and hearings were underway in the relevant Senate and House committees as the fiscal year ended.

In a *Special Report* to the President and to the Congress, transmitted with the proposed legislation, the National Advisory Council analyzed the background and rationale for the new facility, provided a detailed explanation of the facility's operating characteristics, and described the proposed legislation.[1] This NAC *Special Report* concluded that the facility represented a major strengthening of the international monetary system, and that its establishment was of critical importance and in the national interests of the United States. On this basis, the NAC strongly recommended that the legislation authorizing U.S. participation be enacted promptly.

Seventh Quota Review: The IMF Board of Governors Resolution approving the sixth quota increase provided that "the seventh general review of quotas shall be completed by February 9, 1978." At the April 1977 meeting of the Interim Committee a further "adequate" increase in quotas was agreed in principle and the IMF Executive Directors were asked to prepare a report, including recommendations, for the next meeting of the Interim Committee. The IMF Managing Director was unable to develop a consensus on the basis of informal discussions, however, and the Board of Executive Directors report prepared for the Interim Committee's meeting in September 1977 reflected a wide range of views on the size and distribution of the Seventh quota increase and the timing of the next (eighth) review. Because of the widely divergent viewpoints expressed, the Interim Committee did not attempt to reach decisions on the subject at this meeting. Instead, the Committee asked the IMF Executive Directors Board to continue its work with the objective of submitting recommendations at the next meeting of the Interim Committee, scheduled to be held in April 1978.

Activation of the General Arrangements to Borrow (GAB)

The General Arrangements to Borrow (GAB) were established in 1962 by the ten developed member countries of the IMF, including the United States. In the GAB these countries agreed to lend specified amounts of their currencies to the IMF under certain circumstances to facilitate drawings from the IMF by any of the ten participants. Because of the low level of IMF holdings of usable currencies in 1976, and given the potential demand for Fund resources over the next few years, the Managing Director of the IMF decided to activate the GAB to finance a major portion of IMF stand-by arrangements for the United Kingdom and Italy during 1977. Eight participants in the GAB were called upon to provide funds pursuant to their GAB commitments on three separate occasions: in January and May for the United Kingdom and Italy and in August for the United Kingdom.

The United States share of this totaled SDR 1,043 million, ($1.2 billion), of which SDR 945 million ($1.1 billion) was to be for the United Kingdom and SDR 98 million ($115 million) for Italy. As of September 30, 1977 a total of SDR 552 million ($642 million) had been borrowed from the United States by the IMF for purchases by the United Kingdom and SDR 24 million ($28 million) had been borrowed for purchases by Italy.

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[1] House Document 95–224, "U.S. Participation in the Supplementary Financing Facility of the International Monetary Fund." A *Special Report* of the National Advisory Council.

Compensatory Financing and Buffer Stock Arrangements

The IMF Compensatory Financing Facility (CFF), established in 1963 and liberalized in 1966 and 1975, provides IMF member countries—particularly the primary commodity-producing countries—with additional access to Fund resources to meet balance of payments difficulties arising from temporary shortfalls in export earnings due primarily to circumstances beyond their control.

During fiscal year 1976, drawings from the CFF rose dramatically, partly because of the liberalization and partly because of commodity price declines in 1975. The pace of drawings from the CFF during the fiscal year under review in this Report of the NAC has, however, slackened somewhat as world trade conditions have improved. During the U.S. Transition Quarter, drawings amounted to SDR 691 million, bringing the level of CFF drawings outstanding at the close of the fiscal year to SDR 2.8 billion.

The second IMF commodity financing arrangement is the Buffer Stock Facility. This Facility was created in 1969 to assist member countries with balance of payments difficulties to finance contributions to international buffer stocks which satisfy specified criteria. Two international buffer stocks—tin and cocoa—were declared eligible (in 1970 and in 1973, respectively) under the IMF criteria for financial support from this Facility. As a consequence of the improvement in world tin prices, the manager of the tin buffer stock made no calls on participants other than with respect to their initial compulsory contributions. The cocoa buffer stock facility was never established.

Extended Fund Facility

The Extended Fund Facility (EFF) was established in September 1974 to provide assistance to IMF members to meet balance of payments deficits for longer periods and in amounts larger in relation to quotas than under normal IMF credit tranche policies. A member country may draw up to 140 percent of its quota from both this source and from regular IMF resources combined (this joint limit was temporarily raised to 176 percent of quota by the temporary expansion of access to the IMF's regular resources).

At the end of fiscal year 1977, assistance from the Extended Fund Facility had been approved for three countries—Kenya, Mexico, and the Philippines—for SDR 67 million, SDR 518 million, and SDR 217 million, respectively. In August 1975 Kenya drew SDR 7.7 million under its arrangement; Mexico drew SDR 100 million in February 1977; and the Philippines drew SDR 90 million in September 1976 and SDR 78.8 million in August 1977. Total drawings under the EFF amounted to SDR 276.5 million as of the close of the fiscal year.

The Special Drawing Right (SDR)

The IMF Articles of Agreement require the Managing Director to submit to the Board of Governors, not later than 6 months before the end of each basic period (a basic period lasts five years), a proposal with respect to the allocation of Special Drawing Rights (SDR) in the next basic period. Calendar year 1977 is the final year of the second basic period (which began on January 1, 1973) and in 1977 the Managing Director of the IMF submitted a report to the Board of Governors and to the Executive Directors indicating he had concluded there was no proposal for SDR allocation consistent with the IMF Articles of Agreement that had broad support among participants.

At the April 1977 Interim Committee meeting, it was decided to defer a decision on an SDR allocation until the first meeting of the Committee in 1978. The Interim Committee also requested the IMF Board of Executive Directors to "review the characteristics and uses of the SDR so as to promote the purposes of the Fund, including the objective of making the SDR the principle reserve asset in the international monetary system." This review was in progress as the fiscal year ended.

Trust Fund and Gold Auctions

One element of the monetary reform agreement reached in 1975/76 was an IMF decision to sell one-sixth of its gold (25 million ounces) at public auction for the benefit of the developing countries. A portion of the profits from these sales, corresponding to developing countries' share of IMF quotas, is to be distributed directly to each developing country in proportion to its quota share. The remainder is to be used to finance a Trust Fund to provide balance of payments financing on concessional terms to the poorest among the IMF member countries.

Pursuant to the terms of the Trust Fund arrangement, loan disbursements of about SDR 152 million were made in fiscal year 1977 to 24 of the 61 eligible developing countries. In January 1977 a total of SDR 31.588 million was disbursed to 12 countries and in July 1977 a second disbursement of SDR 121.315 million was made to 24 countries. As the U.S. fiscal year ended, the IMF Executive Board was completing arrangements for the first direct distribution to eligible member countries.

Oil Facility Subsidy Account

The IMF Oil Facility was a temporary program designed to respond to emergency needs arising from sharply increased oil prices. New lending from this Facility was terminated on March 31, 1976. Drawings from the Facility totaled SDR 6,902 million by 55 countries during the less than 2 years it functioned.

On August 1, 1975, the IMF established an interest subsidy account under a trust arrangement (separate from the Oil Facility), financed by voluntary contributions, to reduce the cost of borrowing from the Oil Facility by IMF members most seriously affected by increased petroleum prices. Subsidy payments are to be made during the period 1976 to 1983 and the first round of subsidy payments to 18 IMF members was disbursed in July 1976. In May 1977 the IMF Board of Executive Directors adopted a decision to pay subsidies to 18 member countries totaling SDR 27.5 million for the IMF fiscal year ended April 30, 1977. Total payments from the subsidy account amounted to SDR 41.33 million as of September 30, 1977.

INTERNATIONAL MONETARY REFORM

As described in an earlier *Special Report*[2] of the National Advisory Council, agreement was reached in 1976 on reform of the international monetary system. The principal elements of agreement included: the first general revision of the IMF Articles of Agreement since the 1944 Bretton Woods conference—particularly as the Articles relate to exchange rate arrangements and the role of gold; initiation of disposal of one-third of the IMF's gold holdings through market sales and distributions to members; a one-third increase in IMF quotas; and measures to expand access to IMF resources through a temporary expansion of the credit tranches; liberalization of the Compensatory Financing Facility; and establishment of a Trust Fund.

Ratification of the Agreement

While some elements of the reform agreement—the sales and distributions of gold, and increased access to IMF resources—could be implemented under existing IMF authority, the amendments and quota increase will become effective only after the terms of the agreement have been ratified by member countries. The IMF amendments are to enter into force when three-fifths of the members (at least 79 countries) having four-fifths of the total voting power have accepted them. The quota will only become effective after the amendments are accepted and members accounting for at least three quarters of total IMF quotas have consented to the increases in their quotas.

U.S. Legislation: For the United States, Congressional approval of the amendments and of the increase in the U.S. quota was required. Legislation was introduced on May 21, 1976, authorizing acceptance of the proposed amendment and consenting to an increase in the United States quota in the IMF equivalent to SDR 1,705 million. The increase in the U.S. quota was considered an exchange of monetary assets, and therefore did not require an appropriation. The legislation also amended the Bretton Woods Agreements Act and The Special Drawing Rights Act to conform their provisions with the amendments and modified the Gold Reserve Act of 1934 to retain the value of the dollar in terms of gold solely for the purpose of serving as the legal standard for the issuance of gold certificates (i.e., $42.22 per fine troy ounce of gold).

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[2] House Document 94–447, "Amendment of the Articles of Agreement and Increase in Quotas of the International Monetary Fund." A *Special Report* of the National Advisory Council.

The bill was reported favorably by the House Banking Committee on June 21, 1976 with the following amendments: (a) Designating the United States Governor of the IMF as Councillor in the IMF should the provisions of Schedule D of the IMF Articles of Agreement become applicable; (b) Requiring prior Congressional authorization of any action by a representative of the United States approving the establishment of any additional trust fund of the IMF for the special benefit of a single member or of a particular segment of the membership of the IMF; and (c) Broadening the purposes of the Exchange Stabilization Fund from "stabilizing the exchange value of the dollar", to directing the Secretary of the Treasury to use the ESF "as may be necessary to and consistent with the United States obligations in the International Monetary Fund."

On July 27, 1976, H.R. 13955, as amended, was passed by the House.

In the Senate the legislation was introduced on May 19, 1976 and was referred to the Committee on Foreign Relations, with sequential referral to the Committee on Banking, Housing and Urban Affairs. Hearings were held before the Committee on Foreign Relations on June 22 and 29, and on August 3, 1976.

The House-passed bill was introduced in the Senate on July 28, 1976 and was favorably reported in the Foreign Relations Committee, with amendments, on August 10, 1976, and by the Senate and Urban Affairs Banking Committee, with further amendments, on September 22.

The bill—as passed by the House of Representatives—was passed by the Senate and was signed by the President on October 19, 1976. On November 15, 1976 the United States formally accepted the proposed Second Amendment to the IMF Articles of Agreement and consented to an increase of SDR 1,705 million in the U.S. quota in the Fund.

Key Principles of the Reform

Surveillance of Exchange Arrangements: The new exchange rate provisions of the IMF Articles of Agreement retain the basic objectives and purposes of the Bretton Woods monetary system but stress achieving the underlying economic and financial stability which is a prerequisite of exchange rate stability rather than adherence to fixed exchange rates. The new arrangements therefore give countries wide latitude in the choice of the exchange rate practices best suited to their domestic requirements while setting forth specific undertakings regarding the promotion of orderly basic economic conditions and the avoidance of manipulation of exchange rates or the monetary system to prevent adjustment or to gain unfair competitive advantage.

To ensure compliance with these provisions, the IMF is endowed with increased authority to oversee member country policies and practices. Specifically, the Fund is directed to exercise firm surveillance over member country exchange rate policies and to establish principles for the guidance of members with respect to such policies.

Following extended discussions, the IMF Executive Board agreed, in April 1977, on the principles for the guidance of member countries with respect to their exchange rate policies and on the principles and procedures for IMF surveillance of those policies. These principles and procedures were endorsed by the Interim Committee at its April 1977 meeting.

The agreed approach to surveillance focuses on a comprehensive assessment of country policies, both domestic and external, in order to reach a judgement on whether it is manipulating rates to prevent balance of payments adjustment or to gain unfair competitive advantage. This approach does not involve the delineation of detailed or rigid principles for guidance of member policies, which was considered impractical and undesirable. Instead, the agreed approach will involve cautious and careful development, on a case-by-case basis, of a body of "common law" based on experience.

The agreed principles for the guidance of members' exchange rate policies provide that: (a) a member shall avoid manipulating exchange rates or the international monetary system in order to prevent effective balance of payments adjustment or to gain unfair competitive advantage over other members; (b) a member should intervene in the exchange market if necessary to counter disorderly conditions; and (c) member countries should take into account in their intervention policies the interests of other IMF members.

The principles for IMF surveillance of members' policies are more detailed and include developments in a country that might indicate the need for discussions between the Fund and the member—for example protracted intervention in one direction; unsustainable borrowing or lending; and the adoption or intensification of restrictions.

The procedures that the Fund will follow involve regular consultations by members with the Fund under Article IV which will comprehend existing consultation arrangements under Articles VIII and XIV. In addition, procedures were established for discussions between the Managing Director and member countries, and for subsequent review by the IMF Board of Executive Directors, of cases in which the Managing Director considers that a member country's exchange rate policies may not be consistent with the exchange rate principles. It is anticipated that these principles and procedures will evolve further as experience is gained under the new system.

Gold: The amended IMF Articles of Agreement provide for a further reduction in the monetary role of gold by abolishing the official price of gold and gold's position as *numeraire* of the system and by eliminating gold as an important instrument in IMF transactions. It was also agreed to commence the disposal, under existing authority, of 50 million ounces of gold held by the IMF—25 million ounces to be sold for the benefit of developing countries, and 25 million ounces to be sold to IMF members in proportion to quotas. In January 1977, the IMF sold 5.998 million ounces to members at SDR 35 per ounce, with the United States purchasing 1.434 million ounces.

To ensure that gold does not re-emerge as an important monetary instrument during the period when the legal restraints on the use of gold are being removed, the Group of Ten (the major gold-holding nations) agreed to specific arrangements with respect to gold. These arrangements, which included agreement not to increase the total stock of gold held by Group of Ten countries or to take any action to peg the price of gold, came into force on February 1, 1976 and are due to be reviewed by February 1978.

IMF Rules and Regulations: Implementation of the Second Amendment to the Articles of Agreement will require revision of the IMF Rules and Regulations to conform with the amended Articles. Drafts of sections of the revised Rules and Regulations have been circulated and discussed by the Executive Directors but final adoption of any Rules and Regulations will await completion and discussion of the whole body of the IMF's Rules and Regulations. It is anticipated that all necessary provisions will have been adopted by the Executive Directors, and, where required, by the Board of Governors, by the time the amended Articles enter into force.

FOREIGN EXCHANGE MARKET DEVELOPMENTS AND OPERATIONS

During the period covered by this Report of the National Advisory Council, major attention in the foreign exchange markets turned gradually from the critical stabilization problems faced by the major developed countries experiencing large payments deficits (especially Britain, France, and Italy) to the problems posed by the countries experiencing large payments surpluses (especially Germany and Japan). The implications of the growing trade deficit of the United States also became an increasingly important market factor during this period.

Exchange rate movements continued to reflect divergent economic and financial developments—in terms of the dollar, between July 1, 1976 and September 30, 1977 the Japanese yen appreciated by about 13 percent, the German mark by about 11.5 percent, and the Swiss franc by about 5 percent. Among the currencies which depreciated in terms of the dollar, the Canadian dollar declined by about 10 percent, the Italian lira by 5 percent, the French franc by 3 percent, and U.K. sterling by a little more than 2 percent. On a trade-weighted basis in terms of OECD currencies, the dollar appreciated by about 1.25 percent over the period.

Foreign exchange market intervention by the United States continued to be undertaken only to counter disorderly market conditions and was performed for the United States by the Federal Reserve, with operations largely in German marks (DM). The Federal Reserve made net sales of DM in its market operations during July–December 1976: markets were unsettled by speculation leading to the realignment in October of the currencies participating in the European Common Margins ("Snake") arrangement (Belgium, Denmark, Germany, the Netherlands, Norway, and Sweden), by uncertainties surrounding the outcome of the elections in the United States and the policies of the new Administration, and by the possibility of further substantial oil price increases.

During January–June 1977, the Federal Reserve made net purchases of DM. In July 1977, however, net sales of DM again occurred as the market was affected by speculation (following an OECD Ministerial meeting late in June) on the possible appreciation of the currencies of certain countries in strong surplus positions. In financing its intervention operations, the Federal Reserve drew DM from time to time under its reciprocal currency (swap) facility with the Bundesbank. Outstanding drawings on this facility reached a high of $35 million late in July 1977 but no drawings were outstanding either at the beginning, or at the end, of the period under review.

The currencies of the major deficit countries (e.g., the United Kingdom and Italy) depreciated to their low points during the spring and summer of 1976 and subsequent rate movements for these currencies were moderate. The pound sterling, which had traded above $2.03 in January 1976, depreciated by nearly 25 percent to a low of about $1.55½ by October, but was about $1.70 at the end of calendar year 1976. During the ensuing months, as the British position improved and in conjunction with the stabilization program agreed with the IMF, the Bank of England operated to limit the movement of sterling and rebuilt its reserves. On September 30, 1977, sterling was trading at about $1.74¾.

The French franc reached a 1976 low of more than 5.01 per dollar in August of that year, before the institution of the government's stabilization program. This reflected a depreciation of about 9 percent since the franc had been withdrawn from the EC Snake arrangement in March. The franc appreciated to about 4.96½ per dollar by the end of 1976 and was trading at 4.89 on September 30, 1977.

The Italian lira reached a record low of about 920 per dollar in May 1976, reflecting a depreciation of about 25 percent from the rate prevailing in January 1976 when the Bank of Italy temporarily withdrew from the foreign exchange market. Subsequent to the institution of exchange controls and the implementation of a stabilization program in Italy, the lira appreciated to about 875 per dollar by the end of calendar 1976. Rate movements continued to be moderate during 1977, and on September 30, 1977 the lira traded at 882½.

Evidence that the economic stabilization programs adopted in the United Kingdom, France and Italy were making progress contributed to the generally more settled foreign exchange market conditions by the end of 1976. Moreover, in October, a realignment of the currencies within the EC Snake arrangement had relieved pressures which had intermittently disrupted foreign exchange markets earlier in the year.

In June 1976, the Treasury Department, through the Exchange Stabilization Fund (ESF) and the Federal Reserve participated in a multilateral, $5.3 billion package of short-term stand-by facilities for the Bank of England. The ESF and the Federal Reserve agreed to provide up to $1 billion each. The Bank of England drew a total of about $1.5 billion against these facilities, with the ESF and the Federal Reserve each providing $300 million. All drawings were repaid at maturity on December 9, 1976. Following negotiations with the IMF the United Kingdom obtained, in January 1977, an SDR 3,360 million equivalent, 2-year IMF stand-by arrangement. Because only a portion of the IMF facilities would be available immediately, the ESF and the Federal Reserve each agreed to provide short-term swap facilities to the Bank of England of up to $250 million. These facilities were not, however, used and expired in August 1977.

In February 1977 the ESF and the Federal Reserve agreed to participate in a multilateral, medium-term, arrangement for financing certain declines in official sterling balances, as a means of helping in the stabilization efforts undertaken in connection with the United Kingdom's stand-by arrangement with the IMF. Under this arrangement, financing of up to $3 billion would be provided over a 2-year period by the Bank for International Settlements (BIS), backed up by short-term swaps by participating countries. The ESF and the Federal

Reserve agreed to provide a combined amount of up to $1 billion in these short-term swaps to the BIS. There were no transactions under this arrangement during the period under review. (Also in connection with the stand-by arrangement with the United Kingdom, the IMF activated the General Arrangements to Borrow (GAB) for the first time since 1970, as noted earlier in this Chapter).

In July 1976 the Bank of Italy repaid in full the $500 million which it had drawn earlier in the year under its reciprocal currency (swap) facility with the Federal Reserve. Later in the year, Italy also negotiated an SDR 450 million stand-by arrangement with the IMF and, as in the case of the United Kingdom, currencies needed by Italy under the arrangement were provided through the activated GAB.

On August 31, 1976 the Mexican Government announced that the peso would be allowed to float as part of an overall economic adjustment program. The peso immediately depreciated, and subsequently fluctuated within a range of 2[illegible] to 23 pesos per U.S. dollar. In conjunction with its new policies, the Mexican Government entered into negotiations for medium-term financing from the IMF and within this context, the Treasury Department, through the ESF, and the Federal Reserve agreed in September to a special arrangement with the Bank of Mexico making available up to $600 million of interim financing. Under this arrangement the Bank of Mexico drew $365 million in a currency swap with the ESF and repaid that amount in November following a Mexican drawing on the IMF. The remaining $235 million under the arrangement was not utilized. In October 1976 Mexico repaid in full the $360 million drawn under its reciprocal currency arrangement with the Federal Reserve earlier in the year and in November, Mexico drew $150 million from the ESF in two equal installments under its long-standing Exchange Stabilization Agreement with the Treasury Department. At the same time, Mexico drew equivalent amounts on its swap line with the Federal Reserve. The remaining $150 million available under the ESF Agreement was drawn in November and repaid in December. Mexico repaid its outstanding drawings to the Federal Reserve in February and to the ESF in April 1977.

In February 1977, the Treasury Department, through the ESF, agreed to extend up to $300 million in short-term credit facilities to the Bank of Portugal. This ESF arrangement was envisaged as part of a three-phase program of assistance to Portugal involving this short-term credit, drawings on the IMF, and a proposed medium-term multilateral credit facility designed to assist that country in its economic stabilization efforts. Part of the arrangement was utilized in the form of dollar/escudo swaps, which were repaid following Portuguese drawings on the IMF (a $50 million swap was provided in February and repaid in May, and a $35 million swap was provided in May). The remaining $215 million under the arrangement was in the form of reciprocal gold deposits made during the period February to July 1977 which enabled Portugal to utilize part of its gold reserves. All of the facilities were repaid on or before maturity by September 1, 1977 and the arrangement expired.

Toward the latter part of 1976, exchange rate movements became more closely linked to economic and financial developments in the United States. The dollar depreciated in terms of most major European currencies, as markets focused increasingly on the more rapid growth of U.S. monetary aggregates and the decline in U.S. interest rates relative to interest rates in other major countries. Uncertainties regarding the probable policies of the new Administration in the United States were also a factor in this situation. Early in 1977, the dollar appreciated slightly, in part reflecting the reaction to some tightening of U.S. monetary policy, the abatement of initial concerns with respect to the impact of record cold weather on the economy, and signs of economic expansion in the United States.

The major change in the Canadian dollar occurred in November 1976, with a depreciation from about U.S. $1.03 to less than U.S. $0.97. The Canadian dollar had been appreciating earlier in the year, reflecting Canadian progress in reducing inflation and the effects of large Canadian borrowings abroad. With the pace of recovery slowing and unemployment gaining, however, the Separatist Party's election victory in Quebec brought the Canadian dollar under selling pressure. Subsequent concern about Canada's, and especially Quebec's, continuing ability to place long-term bonds in the United States and in other foreign capital markets, as well as Canadian economic performance, led to further depreciation, and by the end of September 1977 the Canadian dollar was trading at U.S. $0.93.

Exchange rates for most major foreign currencies held relatively steady during the first half of calendar 1977. Gradually, however, increasing attention was attracted by currencies of countries in surplus positions and to understandings that such currencies would be permitted to appreciate in response to market forces. Such understandings were set forth in an OECD Ministerial Communique on June 24, 1977. During May and June, the dollar had shown tendencies to depreciate against several currencies as the performance of the United States in controlling inflation appeared to falter. Although relatively firmer interest rates in the United States seemed to offset the effects in the market of continuing large German and Japanese trade surpluses, the question of the impact on the dollar of large and possibly prolonged U.S. trade and current account deficits became an increasingly important market factor.

The OECD Communique appeared to reinforce market expectations that currencies of certain major foreign countries would appreciate. Demand for the Japanese yen, the German mark, and the Swiss franc, in particular, increased sharply, causing these and several other currencies to appreciate and exchange rates to fluctuate more widely than had been the case for several months. Late in July 1977, the firming of U.S. monetary policy and official U.S. statements emphasizing the need for a strong dollar appeared to settle the market to some extent.

Exchange rate fluctuations narrowed early in August. U.S. interest rates were expected to continue rising while consideration of reflationary programs in a number of major countries experiencing surpluses gained momentum as the slowdown in domestic economic activity in these countries became more apparent.

A decision by the United Kingdom in late July to adopt a more flexible exchange rate policy centered on a trade-weighted index for sterling tended to heighten exchange market volatility and led to sterling appreciation relative to the dollar. In August 1977 there was a further realignment of the EC Snake currencies, which included the withdrawal of the Swedish currency from the arrangement.

The annual meetings of the IMF and World Bank at the end of September 1977 provided the setting for further consideration of the implications of the growing U.S. trade and current account deficits, contrasted with the improving positions of the United Kingdom, France, Italy, and the limited prospect that the German and Japanese surpluses would soon diminish.

The German mark had fluctuated narrowly around DM 2.55 per dollar during the February to August period of 1976. A build-up of speculative pressures, largely in anticipation of a DM revaluation within the EC Snake, led to further appreciation and the DM moved to DM 2.40 following the October Snake realignment. Late in the year the DM began to appreciate again, but the rate returned to the DM 2.40 level early in 1977 as the German economy showed signs of weakening and reflows of funds were attracted by countries which had undertaken stabilization measures. The DM traded rather narrowly below that level before appreciating from about DM 2.36 in late June to less than DM 2.25 in late July, (i.e., during the speculative period following release of the OECD Communique). The rate then fluctuated around DM 2.32, before beginning to appreciate again at the end of September 1977.

The Japanese yen had depreciated slightly during the summer of 1976 in advance of the December elections in Japan and amidst apprehension of a major OPEC increase of oil prices. The Japanese trade and current account surpluses had narrowed, and the yen reached nearly ¥300 per dollar before the elections. The yen then resumed appreciating, reaching less than ¥275 in April 1977, during a period in which there were only minor fluctuations in the rates of other internationally important currencies. After a brief period of uncertainty, stemming from the prospects of the imposition of trade restrictions by other major countries on imports from Japan and an easing in Japanese monetary policy, the yen again began to appreciate early in June and had reached ¥263 by early July. Subsequently, the rate fluctuated rather narrowly, and the yen was trading at about ¥264 by the end of September 1977.

Throughout much of the period under review, the Swiss franc attracted funds from countries whose currencies were undergoing selling pressure, primarily because of the low rate of inflation in Switzerland and its large current account surplus. The Swiss franc depreciated slightly in the summer of 1976, however, in part reflecting the imposition of Swiss exchange controls. During the period July to September 1976 the franc fluctuated between SF 2.46 and SF 2.50, and was trading around SF 2.45 by the end of the year. The franc then depreciated again and traded above SF 2.56 in March 1977. During this period, with Swiss interest rates low and capital outflow encouraged, there were reflows from the Swiss franc to the currencies of countries where stabilization programs were beginning to take effect. In April 1977, despite the adverse effects of reports of losses at the Chiasso branch of a major Swiss bank, the franc began to appreciate, and by the end of July traded below SF 2.40. The rate was fairly steady in August, but in September 1977 the franc appreciated to a record high in terms of the dollar of less than SF 2.35.

GOLD MARKET DEVELOPMENTS

After receding from $123¼ to $103½ per fine troy ounce in July and August 1976, gold market prices reversed direction and generally increased during the remainder of the period covered by this Report of the NAC. By the beginning of November 1976 prices had returned to the early July levels and continued to rise in quiet-to-moderately-active markets, with late February 1977 trading at $137. The recovery of industrial demand, increased interest from Middle-Eastern sources, declining interest rates, indications of record grain harvests in the Soviet Union as well as forecasts of continued strong demand appeared to sustain this price rise. By late March, prices had increased to more than $153 per fine ounce, with demand fueled by renewed apprehension over inflationary trends in major countries and a further easing of interest rates coupled with concerns regarding economic developments in the United States. Prices subsequently declined to a low of about $137 by mid-June 1977 but by the end of September 1977 had risen to $154—the highest level in about 2 years—with the gold market being significantly affected by foreign exchange market uncertainties.

UNITED STATES BALANCE OF PAYMENTS DEVELOPMENTS

The principal development in the United States balance of payments during fiscal year 1977 was the continued rapid increase of the merchandise trade deficit which had first appeared in the third (January–March) quarter of fiscal 1976 at $0.8 billion and which rose to $2.8 billion in the Transition (July–September) Quarter and to $7.6 billion in the fourth (July–September) quarter of fiscal year 1977. As a consequence, trade for the whole fiscal year moved from balance in fiscal 1976 to a deficit of $26.2 billion in fiscal 1977.

The primary causes of the worsened trade balance were the sharply higher volume of oil imports at increased prices and a near-stagnation of non-agricultural export volume due to the combined effect of unexpectedly sluggish economic recovery in major foreign countries and stabilization programs undertaken by a number of less developed and smaller developed countries faced with balance of payments difficulties.

Growth of nonpetroleum imports during fiscal year 1977 was vigorous, and generally in line with the historical relationship to domestic business activity. Agricultural exports also recorded a respectable gain in value as well as volume.

Partially offsetting the higher trade deficit was a $13.6 billion gain in the surplus on current invisible transactions which took place between the Transition Quarter and the Third (April–June) quarter of fiscal year 1977 (latest data available at press time for this Report).

Since net invisible receipts did not increase enough to offset fully growing quarterly trade deficits during the Transition Quarter and the first three quarters of fiscal 1977, the current account deficit rose from $1.1 billion in the Transition Quarter to $4.6 billion in the third (April–June) quarter of fiscal 1977. As a result, the current account deficit for this period reached $11.3 billion as compared with the $1.7 billion surplus recorded in fiscal year 1976.

The sharply increased current account deficit, plus continued government lending and moderately larger net outflows on nonbank private capital transactions, was financed by increased holdings (particularly by other industrial countries) of foreign official assets in the United States.

TABLE 4.—*U.S. Current Account Transactions, July 1975–September 1977*
[Seasonally adjusted; in $ billion, rounded]

	Fiscal 1976 (Quarterly averages)	Transition Quarter	Fiscal 1977*			
			Oct.–Dec. 1976	Jan.–Mar. 1977	Apr.–June 1977	July–Sept. 1977
Exports	27.4	29.6	29.7	29.5	30.7	30.9
Agriculture	5.6	6.2	5.9	6.1	6.7	6.0
Other	21.8	23.4	23.8	23.4	24.0	24.9
Imports	–27.1	–32.4	–33.3	–36.6	–38.3	–38.4
Petroleum & products	– 7.5	– 9.4	– 9.3	–11.0	–11.9	–11.4
Other (incl. other fuels)	–19.6	–23.0	–24.0	–25.6	–26.4	–27.0
Trade balance	.3	– 2.8	– 3.6	– 7.1	– 7.7	– 7.6
Net services & remittances	2.0	3.2	2.8	3.5	3.8	4.1
Government economic grants	– .6	– 1.5	– .6	– .6	– .7	– .8
Net invisibles	1.4	1.7	2.2	2.9	3.1	3.2
Balance on current account	1.7	– 1.1	– 1.4	– 4.3	– 4.6	– 4.3

* Due to seasonal adjustment on calendar-year basis, quarterly data will not add precisely to fiscal-year totals.

Source: Department of Commerce.

TABLE 5.—*Financing of U.S. Current Account Balances, July 1975–September 1977*
[Inflow (+) and outflows (–); in $ billion, rounded]*

	Fiscal 1976 (Quarterly averages)	Transition Quarter	Fiscal 1977			
			Oct.–Dec. 1976	Jan.–Mar. 1977	Apr.–June 1977	July–Sept. 1977
Current account balance *	1.7	–3.8	.3	–3.4	–4.7	–6.8
U.S. reserve assets (increases (–))	– .7	– .4	.2	– .4	.0	.2
Other U.S. Government assets *	– .8	–1.3	–1.0	–1.1	– .8	–1.0
Foreign official assets	2.3	3.1	7.0	5.7	7.9	8.2
U.S. banks, net [a]	–1.9	–1.6	–4.1	–1.9	1.8	.9
Securities, net [a]	– .5	.4	–2.2	1.2	–2.4	– .4
Direct investment, net	– .6	– .6	– .4	.1	–1.4	– .4
Other U.S. corporate capital, net	–1.0	.4	–1.2	–1.1	–1.5	2.1
Statistical discrepancy *	1.5	3.9	1.5	.8	1.2	–2.8

* All data in this table are *seasonally unadjusted*, because capital flows except U.S. Government lending are not available on seasonally adjusted basis.

[a] Excluding foreign official assets.

Source: Department of Commerce.

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IV. MULTILATERAL ECONOMIC DEVELOPMENT ASSISTANCE

- During fiscal year 1977 Congress approved legislation authorizing $5,124.7 million for increased U.S. participation in the World Bank Group, the Asian Development Bank, and the African Development Fund. This legislation (Public Law 95–118), provided $1,568.9 million for the International Bank for Reconstruction and Development (IBRD), $111.5 million for the International Finance Corporation (IFC), $2,400 million for the Fifth Replenishment of the International Development Association (IDA), $814.2 million for the Asian Development Bank (ADB), $180 million for the Asian Development Bank's soft loan window—the Asian Development Fund (ADF), and $50 million for the African Development Fund (AFDF).

- During the period under review, the Administration also requested appropriations totaling $2,616.2 million for the international development banks for fiscal year 1978 and Congress appropriated $1,925.5 million of the amount requested. The sums requested comprised $523 million for the IBRD, $44.6 million for the IFC, $1,575 million for IDA, $400 million for the IDB, $200 million for the IDB Fund for Special Operations, $203.6 million for the Asian Development Bank, $60 million for the Asian Development Fund, and $10 million for the African Development Fund.

- The World Bank Group, the Inter-American Development Bank, the Asian Development Bank, and the African Development Fund extended loans and credits totaling $9,184 million during the 12-month period ending June 30, 1977. This was two percent higher than the preceding year's level of $8,999.3 million.

- At a meeting in Vienna in March 1977, 26 countries pledged contributions of $7.6 billion for the Fifth Replenishment of the resources of the International Development Association over the 3-year period beginning July 1, 1977. The United States pledged $2.4 billion of the total amount, subject to authorization and appropriation by Congress.

- On October 15, 1976 the Board of Governors of the Asian Development Bank ratified a 135 percent increase of the Bank's capital subscriptions. This replenishment became effective on September 30, 1977. The capital increase amounts to $5,003 million and consists of 10 percent paid-in capital and 90 percent callable capital. The share of the United States in this capital increase is $814 million.

- During 1977 arrangements for establishing the International Fund for Agricultural Development (IFAD) neared completion. The objective of IFAD is to develop and finance projects to promote food production through emphasis on helping small farmers in developing countries. The $1 billion pledge target prerequisite to opening the IFAD Articles of Agreement for signature was passed during the period under review and a number of countries deposited their instruments of ratification. A United States pledge of $200 million will be the largest single contribution to IFAD.

- The new Administration's strong support for advancing the cause of human rights coupled with intensified Congressional interest have caused human rights to become a priority element in United States foreign policy and an important factor in the U.S. position *vis-a-vis* the international development banks. The United States believes that its support for loans by the international development banks should take into account the human rights policies of borrowing member countries and feels that the banks should channel assistance to countries other than those which engage in a consistent pattern of gross violations of internationally recognized human rights. United States opposition to a loan proposal provides a clear indication of the importance it attaches to improving human rights conditions worldwide.

UNITED STATES MULTILATERAL DEVELOPMENT FINANCE POLICY OBJECTIVES

The international development lending institutions—the World Bank and its affiliates; the Inter-American Development Bank; the Asian Development Bank; and the African Development Fund—support numerous fundamental humanitarian, security, political, and economic objectives of the United States in the developing world.

These banks help promote the economic and social advancement of the poorer countries through the provision of financing for sound development projects and programs and by assisting countries in the formulation of appropriate economic policies. The banks are particularly effective instruments for assisting development because of their political independence and highly qualified professional staff. During the past 5 years the development banks have placed increasing emphasis on reaching the poorest segments of the population in the developing world and on directly improving the productivity and income levels of these groups. The banks are thus important instruments in the global attack on poverty and misery and, in this, complement rising U.S. interests in helping to meet the basic human needs of the world's poorest people.

The international development lending institutions (IDLIs) also help advance the security objectives of the United States. Instabilities in the developing countries are often fostered—or created—by economic stagnation which, in turn, can lead to international tensions and conflict. By helping to raise the living standards of the world's poor, the IDLIs contribute to the reduction of social strains which frequently underlie international conflicts, thereby promoting world peace and stability.

United States economic relations with the developing countries are also promoted by the IDLIs. Development fostered by these banks stimulates demand for goods and services produced in the developed countries, thus expanding the potential market for U.S. products. Moreover, the development banks help promote a better environment for United States investments in the developing countries by encouraging and assisting their governments to adopt sound economic policies and market-oriented institutions. This role can be particularly important in the raw materials sector, in that the banks help stimulate private capital flows for the development of natural resources in the developing countries and thus help obtain U.S. access to needed raw materials.

Global economic and financial changes brought about by higher oil prices, inflation, and recession, necessitate adjustments by all countries. The development banks, by providing financial resources for sound projects and programs, plus economic advice, also serve to help the developing countries achieve sustainable long-term balance of payments positions. Thus, the IDLIs play an important role in maintaining the strength and stability of the international monetary system as well.

The international development lending institutions also serve in fostering United States political interests in the developing countries. Our contributions to the IDLIs represent concrete evidence of the U.S. commitment to the promotion of economic growth in these countries through institutions which are solely interested in development and which include representatives of the developing countries. For these reasons, our contributions can be very effective tools for improving U.S. relations with countries in the developing world.

United States support of the international development banks plays a key role in maintaining a constructive North/South dialogue. Direct resource transfers must play a central role in our response to the needs and demands of the developing nations and such transfers, particularly through the IDLIs, are preferable to the various types of indirect resource transfer mechanisms (e.g., generalized debt relief or artificial support for commodity prices) which are frequently called for by some developing countries.

The multilateral development banks provide a method of achieving more equitable sharing among donor countries of the cost of financing development. International negotiations among contributors are utilized to determine shares in bank resource replenishments, thus helping to achieve equitable burden-sharing arrangements. The fact that the United States share in the total resources of each of the development banks is declining is evidence that this burden-sharing function is effective.

In addition, the development banks are able to supplement the capital received from member governments through borrowings in world private capital markets. These borrowings are made possible by the satisfactory financial and managerial reputations of the institutions, coupled with the "callable capital" guarantee of member governments (although the banks have never had occasion for recourse to the callable capital guarantee.)

The development banks also facilitate capital flows to sound projects in developing countries through "co-financing" arrangements with other lenders. Co-financing with official donors can improve the effectiveness of development assistance by, *inter alia*, permitting donors to tap the knowledge and expertise of the development banks. Co-financing with private financial institutions is also expanding. Such arrangements assist the developing countries in establishing themselves in private financial markets—thereby reducing their dependence on official assistance programs and contributions.

LEGISLATIVE ACTIVITIES IN 1977

Authorizing Legislation

During fiscal year 1977 the United States Congress approved legislation authorizing $5,124.7 million of increased U.S. participation in the World Bank Group, the Asian Development Bank and the African Development Fund. The relevant legislation, signed into law on October 3, 1977 (Public Law 95–118), provided $1,568.9 million for the International Bank for Reconstruction and Development (IBRD), $111.5 million for the International Finance Corporation (IFC), $2,400 million for the Fifth Replenishment of the International Development Association (IDA), $814.2 million for the Asian Development Bank (ADB), $180 million for the Asian Development Bank's soft loan window—the Asian Development Fund (ADF), and $50 million for the African Development Fund (AFDF). The legislation specifies that none of the subscriptions authorized can be made until the necessary funds have been appropriated. With respect to the U.S. contributions to IDA and the other concessional loan windows of the banks, the legislation also provides that any commitments to furnish these funds must be made subject to the obtainment of the necessary appropriations.

The World Bank Group: In May 1976 the Executive Directors of the IBRD recommended that the World Bank be authorized to increase its capitalization by $8.4 billion. Of this amount, 10 percent would be paid-in and 90 percent would be in the form of callable capital.

The United States share under the proposal was set at $1,568.9 million, or 18.3 percent of the total. When this capital increase and resulting subscriptions have become fully effective, U.S. voting power in the IBRD will decline from its present level of 22.6 percent to 21.9 percent—a reduction deemed to be consistent with the relative increase in the economic strength of other donors to the Bank.

Also in May 1976 the Board of Directors of the International Finance Corporation (IFC) recommended a $540 million increase in the authorized capital of the Corporation. This is the first increase in the IFC's capitalization since it was established in 1956. The U.S. share in the replenishment was set at $111.5 million, or 23.4 percent of subscribed capital. As a result of this capital increase the share of the United States in the funding of the IFC will decline from 33 percent to 25 percent.

In March 1977 the Part I members of the International Development Association (IDA) concluded negotiations for a Fifth Replenishment of IDA resources. This $7.6 billion replenishment (IDA V) will provide IDA with loanable funds between July 1, 1977 and June 30, 1980. The United States share of the replenishment was set at $2,400 million, or 31.4 percent of the total—a decrease from the 33.3 percent U.S. share in the Fourth Replenishment of IDA.

Asian Development Bank and African Development Fund: In October 1976 the Board of Governors of the Asian Development Bank (ADB) approved a resolution to increase the Bank's authorized capital stock by $5,003.9 million. Under this replenishment resolution, 10 percent of the increase is to be in the form of paid-in capital and 90 percent in the form of callable capital. The replenishment is designed to provide resources to finance ADB lending during the 4-year period 1978 to 1981. The United States share was set at $814.2 million, or 16.3 percent of the total.

Also in 1976, ADB members agreed on an $809 million replenishment of the Asian Development Fund (ADF). Under the terms of this agreement the United States share was set at $180 million, or 22.2 percent of the total—down from the 28.5 percent U.S. share in the original resource mobilization for the ADF. This replenishment is to finance Asian Development Fund soft loan operations from 1976 through 1978.

During consideration of the Administration's request for this authorizing legislation for the World Bank Group and the Asian Development Bank, Congress added a $50 million authorization for United States participation in the replenishment of the African Development Fund (AFDF). As reported in last year's *Annual Report* of the NAC, the United States joined the African Development Fund in November 1976 and thus had not participated in the first replenishment of AFDF resources which had been completed in the spring of 1976. The authorizing legislation also directs the Secretary of the Treasury to commence discussions with other donor nations to the African Development Fund for the purpose of setting amounts and reviewing and possibly changing the voting structure of the AFDF.

Amendments on Human Rights, Technology and Agricultural Commodities: The authorizing legislation discussed in the preceding paragraphs also contains three separate provisions relating to development bank operations dealing with human rights, the utilization of light capital technology and lending for specified agricultural commodities.

Title VII of the legislation directs the United States Government to advance the cause of human rights, through its voice and vote in the international development banks, by seeking to channel assistance toward countries other than those whose governments engage in a consistent pattern of gross violations of internationally recognized human rights or which provide refuge to individuals committing acts of international terrorism by hijacking aircraft. In addition, the U.S. Executive Directors in the international development lending institutions are required by the legislation to oppose loans and other types of financial assistance to any country which engages in a consistent pattern of gross violations of human rights, unless such assistance is directed specifically to programs which serve the basic human needs of the citizens in the borrowing countries.

Further, the legislation provides that the Secretary of the Treasury shall instruct the U.S. Executive Directors of the banks to consider, in carrying out their duties: (a) specific actions by either the Executive Branch or the

Congress on individual bilateral assistance programs because of human rights considerations; (b) the extent to which the economic assistance provided by the development banks directly benefits needy people in recipient countries; (c) whether the recipient country has detonated a nuclear device and is not a State Party to the Treaty on the Nonproliferation of Nuclear Weapons, or both; and (d) in relation to assistance for Vietnam, Laos and Cambodia, the responsiveness of the governments of these countries in providing a more substantial accounting of Americans missing in action.

In addition, the Secretary of the Treasury and the Secretary of State are instructed to initiate a wide consultation designed to develop a viable standard for meeting basic human needs and the protection of human rights, and a mechanism for acting together to ensure that the rewards of international economic cooperation are especially available to those countries which subscribe to such standards and are seen to be moving toward making them effective in their own systems of governance. Finally, the current legislation repealed the Harkin Amendment on human rights, which applied to the IDB and AFDF and was discussed in last year's *Annual Report* of the NAC.

Title VIII of the authorizing legislation declares that the United States Government, in exercising its voice and vote in the international development banks, shall promote the development and utilization of light technology as a major facet of their development strategies with major emphasis on the production and conservation of energy through light capital technologies. Title IX of the legislation requires the U.S. Executive Directors of the international development banks to oppose any loan or other financial assistance for establishing or expanding production for export of palm oil, sugar or citrus crops if such will cause injury to U.S. producers of the same, similar, or competing agricultural commodities.

Appropriation Legislation

During the period under review, the Administration requested appropriations totaling $2,616.2 million for the international development banks for fiscal year 1978, an increase of 150 percent over the $1,141.5 million appropriated for these banks for fiscal 1977. The Congress appropriated $1,925.5 million of the amount requested.

The sums requested comprised $523 million for the first of three installments for the U.S. contribution to the selective capital increase of the IBRD, $44.6 million for the first of three U.S. installments to the capital increase in the IFC, $1,175 million for IDA ($375 million for the third of four U.S. installments to the Fourth Replenishment of IDA (IDA IV) and $800 million for the first of three U.S. installments to IDA V), $400 million for the capital of the Inter-American Development Bank (IDB), $200 million for the IDB Fund for Special Operations (FSO), $203.6 million for the Asian Development Bank, $60 million for the Asian Development Fund, and $10 million for the African Development Fund.

More than half of the $690.7 million which was requested but not appropriated by the Congress represented the elimination of the $375 million requested for IDA IV. In addition, Congress reduced the Administration's request for the IBRD by $143 million, the request for the IFC by $6.6 million, the request for the capital of the IDB by $138.7 million, for the FSO by $125.3 million, for the Asian Development Bank by $35.6 million, and for the Asian Development Fund by $10.5 million. Table 6 presents a tabular summary of the amounts requested by the Administration and the amounts appropriated by Congress for each bank.

Amendments on Countries and Agricultural Commodities: During House of Representatives consideration of this appropriation legislation amendments were added providing that none of the funds appropriated under the legislation could be expended to finance any direct or indirect (i.e., through the international development banks) assistance to any one of seven countries (Cambodia, Laos, Vietnam, Angola, Mozambique, Uganda, and Cuba), or any assistance through the international development banks, to establish or expand the production of palm oil, sugar, or citrus crops. The effect of these amendments, had they become law, would have been that the international development banks could not have accepted the funds appropriated by Congress since, under their respective Charters, the banks are pro-

Table 6.—*U.S. Appropriations for the International Development Banks*
[$ millions]

	Appropriations (FY 1978)	
	Administration request	Amounts appropriated by the Congress
IBRD		
Paid-in Capitrl	52.3	38.0
Callable Capital	470.7	342.0
IFC	44.6	38.0
IDA	1,175.0	800.0
IDB		
Paid-in IRC	40.0	36.711
Callable IRC	160.0	145.927
Callable OC	200.0	182.639
FSO	200.0	114.723
ADB		
Paid-in Capital	20.4	16.799
Callable Capital	183.2	151.189
ADF	60.0	49.512
AFDF	10.0	10.0
Total	2,616.2	1,925.5

Source: Treasury Department.

hibited from accepting contributions from any member country so conditioned.

The Administration strongly opposed these restrictions and they were deleted from the draft legislation. Thus there is no reference to either issue in the appropriations legislation. To help achieve this result, President Carter indicated that he would instruct the U.S. Executive Directors in the international development banks to oppose and vote against, throughout fiscal year 1978, any proposed loans by the banks to the seven countries mentioned in the House amendments, and to oppose and vote against proposed loans for the production of the three specified agricultural commodities when such production is for export and could injure United States producers.

DEVELOPMENT LENDING BY THE IDLIs DURING 1977

The World Bank Group, the Inter-American Development Bank, the Asian Development Bank and the African Development Fund extended loans totaling $9,184 million during the 12-month period ending June 30, 1977.[1] This represented an increase of two percent over the previous year's level of $8,999.3 million. Moreover, the $9.1 billion figure includes, for the first time, lending by the AFDF. If AFDF lending is excluded, the increase in 1977 lending over the previous year would be less than one percent. Despite the small absolute increase, however, the 1977 IDLI lending level represents 16 percent of cumulative lending ($58 billion) by these banks through June 30, 1977.

IDLI lending in 1977 was concentrated in agriculture with this sector accounting for 31.5 percent or $2.9 billion of the total—up substantially from the 24 percent of total lending to this sector in fiscal year 1976. The expansion of agricultural lending reflects, in part, increasing concern on the part of the IDLIs for satisfying the basic human needs of the poorest segments of the population in the developing countries. The increased productivity and output needed to attain this objective is being fostered both through such traditional types of agricultural lending as credit facilities and hybrid seeds, and through more innovative activity such as integrated rural development projects combining into a single program all of the productive inputs and infrastructure necessary to raise per capita income.

The expansion of agricultural lending by the IDLIs took place largely at the expense of lending to such traditional sectors as transportation/communications and power. Lending to these sectors declined in absolute as well as relative terms during the period under review. Loans in the transportation/communications sector declined from $1.8 billion in fiscal 1976 to $1.6 billion in 1977 or a reduction from 21 percent of total IDLI lending to 17 percent. Loans for power declined from $1.3 billion (14 percent of total lending) to $1.1 billion (12 percent). Lending to the industry/mining sector increased by $355 million, to $1,284 million in 1977 or 14 percent of the total for that period as compared to 10 percent in fiscal year 1976. (This increase reflects, in part, continuing IDLI concern with increasing non-agricultural employment in the developing countries.)

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[1] Although the U.S. fiscal year no longer ends on June 30, for purposes of consistency in data presentation, a 12-month period ending June 30 has been retained as the data base for IDLI lending programs and resources. References in this section of the Report to the year 1977 in the discussion of these subjects are therefore to the 12-month period ending June 30, 1977. References to fiscal year 1976 are for the 12-month period ending June 30, 1976 (previously, the U.S. fiscal year).

During the 12 months ending June 30, 1977, the World Bank Group was again by far the most important international development lending institution assisting the developing countries. World Bank Group loans amounted to $7,327 million, or approximately 80 percent of all development bank lending. The IDB, the second largest institution, committed $1,247 million, or about 13 percent of the total. Of the remainder, the ADB committed $492 million, or 5 percent of the total, and the AFDF committed $118 million, or about one percent of the total.

Table 7 tabulates IDLI lending during the year ending June 30, 1977, by institution and by sector of lending.

World Bank Group Programs and Resources

The World Bank Group committed a total of $7,327 million in loans and other forms of assistance to borrowing member countries during 1977, an increase of $449 million, or 6.5 percent, over the level in U.S. fiscal year 1976. Of this amount, IBRD lending totaled $5,760 million in 1977 (compared with $4,977 million in fiscal year 1976) for an increase of nearly 16 percent, new IDA credits declined 21 percent to $1,308 million (from $1,655 million in fiscal 1976), due largely to foreign exchange losses it incurred as a result of currency shifts and the absence of Switzerland's expected contribution and IFC commitments increased to $259 million in 1977 (vs. $230 million in fiscal 1976), an increase of 9.8 percent.

As of June 30, 1977, total IBRD commitments outstanding amounted to $30,574 million, total IDA credits were $11,707 million and IFC commitments outstanding totaled $1,712 million.

During the 12 months ending June 30, 1977 both the IBRD and IDA progressively concentrated on lending for agricultural development. IBRD commitments in the agricultural sector in 1977 came to $1,585 million (27 percent of total IBRD lending), as compared with $1,258 million (25 percent of lending) in U.S. fiscal year 1976. The amounts for agriculture committed by IDA increased relatively more rapidly, from $418 million in fiscal year 1976 to $670 million in 1977, representing a doubling, from 25 percent to 51 percent, of IDA's program in agriculture. These higher lending levels evidence not only the World Bank Group's rising commitment to a direct attack on rural poverty

TABLE 7.—*International Development Bank Lending for the Period July 1, 1976—June 30, 1977*

[Millions of dollars]

Sector	World Bank			IDB		ADB				
	IBRD	IDA	IFC	OC/IRC	FSO	OC	ADF	AFDF	Total	Percent
Agriculture	1584.8	670.1	21.6	151.4	266.8	74.3	84.9	37.0	2890.9	31.5
Preinvestment				7.0	43.3				50.3	0.5
Development Finance Company	630.7	25.5		[a]	[a]	[a]	[a]	[a]	656.2	7.1
Education	210.1	78.5		60.0	39.1			16.3	404.0	4.4
Industry/Mining	720.8	16.0	219.7	162.4	62.5	30.0	72.5		1283.9	14.0
Non-Project	226.5	90.0							316.5	3.4
Population	42.5	4.8						5.5	52.8	0.6
Power	784.5	167.0		122.7		52.0			1126.2	12.3
Tourism	98.6		2.6	24.0					125.2	1.4
Transportation/Communications	1015.6	172.0	15.0	129.0	82.0	96.0	32.4	27.4	1569.4	17.1
Urbanization	128.2	30.0			6.5	21.7			186.4	2.0
Water Supply	316.5	38.2			84.1	15.0	13.5	31.9	499.2	5.4
Export Financing				5.7					5.7	0.1
Technical Assistance	1.5	15.4							16.9	0.2
Total	5760.3	1307.5	258.9	662.2	584.3	289.0	203.3	118.2	9183.7	100.0

[a] Loans to Development Finance Companies are distributed between Agriculture and Industry/Mining.

Source: IBRD–International Bank for Reconstruction and Development, IDA–International Development Association, IFC–International Finance Corporation, IDB–Inter-American Development Bank, ADB–Asian Development Bank, and AFDF–African Development Fund.

but a shift in emphasis to direct assistance to productive sectors rather than indirect help through infrastructure-type lending operations.

The IBRD and IDA committed resources in 1977 for 228 projects, totaling $7,067 million, in 74 countries distributed as follows: Africa 68 projects ($964 million); Asia 68, ($2,639 million); Latin America 48, ($1,893 million); Europe, Middle East and North Africa 44, ($1,570 million). India was the largest single borrower from the World Bank Group ($750 million), Korea the second ($444 million), and Indonesia the third ($440 million).

IFC commitments during 1977 were for 35 enterprises in 20 developing countries. These commitments included seven projects in Europe, the Middle East and North Africa (34 percent of the total); 11 projects in Asia (14 percent); 10 projects in Latin America (38 percent); and seven in Africa (13 percent). Brazil was the largest single recipient ($46 million) followed by Greece ($40 million), and Yugoslavia ($21 million).

In 1977 the IFC undertook its first investments in the new area of strengthening local capital markets in developing countries. It assisted in the creation of the first mutual fund management company in Thailand and in Kenya and Korea provided direct contributions designed to help small business financing through loans administered by local commercial banks. While projects such as these constituted only a small proportion (9 percent) of total IFC investment, this area appears likely to become one of greater concern and importance to the IFC.

IBRD: Resources to fund IBRD operations derive from five sources: paid-in capital subscriptions; Bank borrowings in private capital markets and from governments and central banks; sales of loan participations; principal repayment on loans; and earnings on loans and investments.

To an increasingly greater extent, borrowing has been providing the bulk of IBRD funds. In 1977 gross borrowings by the Bank reached a record high, with 39 issues totaling $4,721 million, or $910 million (23 percent) more than had been derived from borrowings during the preceding fiscal year. During a 5-year period ending June 30, 1977, gross borrowings by the IBRD aggregated $15,618 million, or more than two and a half times the amount raised through borrowings during the preceding 5 years.

As was the case in U.S. fiscal year 1976, the principal location of Bank borrowings in 1977 was the private capital market in which 28 issues totaling the equivalent of $3,545 million, were sold, amounting to slightly more than 75 percent of the funds raised by the Bank through borrowings. Borrowings from governments and central banks which, combined, accounted for more than 70 percent of the IBRD's borrowed funds during the period 1973 to 1975 amounted to $1,138 million, or 24 percent of the Bank's borrowings in 1977. (This was also $213 million less than such borrowings in fiscal 1976.)

During 1977 the Bank borrowed $30.8 million from the Interest Subsidy Fund (Third Window), a facility created on a voluntary basis in fiscal year 1976 to enable the Bank to extend loans at interest rates intermediate between standard Bank rates and the lower cost IDA credits. Aggregate borrowings by the Bank from the Interest Subsidy Fund totaled $160.3 million as of June 30, 1977.

During the year under review, the Bank's publicly and privately borrowed resources came principally from the following countries: $1,850 million in the United States; $1,357 million in Germany; $750 million through the issuance of 2-year dollar bonds to central banks and other government agencies in 69 countries; $502 million in Switzerland, $160 million in Saudi Arabia, and $100 million in Yugoslavia.

The Bank's outstanding funded debt increased during this period by $3,821 million to reach $18,478 million on June 30, 1977. As of that date, it was estimated that 28 percent of Bank bonds was held by investors in the United States, 24 percent in Germany, 9 percent in Japan, 8 percent in Switzerland, and 7 percent in Saudi Arabia. The remaining 24 percent of outstanding borrowings was held by central banks and government agencies in more than 80 countries.

During the 12 months ending June 30, 1977, the Bank's borrowers repaid $773 million of principal (raising cumulative repayments on Bank loans to $8,014 million), of which $5,658 million was repaid to the Bank and $2,356 million to purchasers of participations in Bank loans. Income on Bank investments rose to $536 million, $111 million, or nearly 26 percent more than income during the preceding year. Income on loans passed the $1,000 million mark in this period, rising to a total of $1,071 million. For the same period, sales of participations in the Bank's loan portfolio amounted to $165 million (compared with loan sales of $42 million in fiscal year 1976)—the highest level of such sales in nearly a decade.

Net income of the Bank in 1977 was $209 million, down $11 million, or nearly 5 percent, from the previous year. However, after adjustment for the effects of current devaluations, net income amounted to $198 million in 1977, as against adjusted net income of $69 million for the previous year. At their Annual Meeting at the end of September 1977, the Board of Governors of the Bank approved a transfer of $100 million of income as a grant to IDA. The remainder was allocated to the Bank's general reserve.

Gross borrowings by the Bank during 1977 were substantially in excess of Bank disbursements ($2,636 million) and, consequently, Bank liquidity increased by $1,554 million—to a total of $7,949 million, or 51 percent of its estimated gross borrowing requirements over the next 3 years.

As noted in last year's *Annual Report* of the NAC, the IBRD adopted a new lending rate formula on July 1, 1976, which, *inter alia*, prescribes periodic adjustment of the rate to reflect changes in Bank borrowing costs. The interest rate on Bank loans was fixed at 8.9 percent in July 1976. The rate was reduced to 8.7 percent in October 1976, to 8.5 percent in January 1977 and was set at 8.2 percent during the second quarter of calendar year 1977.

IDA: At a meeting in Vienna in March 1977, twenty-six countries pledged contributions of $7.6 billion for the Fifth Replenishment of the resources of the International Development Association over the 3-year period beginning July 1, 1977. The United States pledged $2.4 billion of the total amount, subject to authorization and appropriation by the U.S. Congress.

The United States views IDA as playing a central role in the international development process. IDA credits are extended for periods of 50 years, with 10-year grace periods, carry an annual service charge of only 0.75 percent and are extended to the poorest among the developing countries. While countries with per capita incomes of less than $520 equivalent (1975 dollars) are eligible to receive IDA credits, particular attention is given to countries with per capita incomes of less than $200 equivalent (1975 dollars). During the 12-month period ending June 30, 1977, approximately 87 percent of IDA credits was granted to countries with less than $200 equivalent per capita income levels.

During 1977, IDA granted new credits totaling $1,308 million for 67 projects—a decrease of $347 million from the previous year's level due principally to the declining value of several currencies and the inability of Switzerland to make its contribution to the Fourth Replenishment of IDA resources. Total cumulative credits held by IDA on June 30, 1977 amounted to $11,707 million. Total resources provided to IDA increased by $277.4 million during the year, largely because of the IBRD grant of $100 million from net income and Italy's notification of a $115.7 million contribution to the Fourth Replenishment of IDA.

IFC: The year 1977 witnessed the continuation of the process for approval of the replenishment of the resources of the International Finance Corporation. This replenishment would increase the authorized capital of the IFC by $540 million, to a total of $650 million. To become effective, members holding three-quarters of the total voting power of the IFC must approve the replenishment. The proposed share of the United States in the new subscribed capital will be $111.4 million (or 23 percent of the total).

In 1977, the IFC made loan and equity investments totaling $259 million in 34 enterprises in 20 developing countries—an increase of 9.8 percent over the previous year's level of activity. The IFC's quasi-governmental and private sector partners contributed $1,168 million during the year to joint projects, compared with an average of $1,018 million during the preceding 4 years. IFC operations in 1977 raised the cumulative gross total of its loans and equity investments to $1,712 in the 305 enterprises in which it has invested since the Corporation was established in 1956.

World Bank Group—Major Issues and Developments

Annual Meetings: At the October 1976 annual meeting of the World Bank in Manila, the Secretary of the Treasury outlined the concerns and efforts of the United States for assisting the developing world. In his address the Secretary emphasized that a shared prosperity between the developed and developing countries was the best means of promoting development and affirmed the priority being given to the on-going replenishment efforts by the Administration in Congress.

At the September 1977 annual meeting of the World Bank in Washington, D.C. the Secretary of the Treasury stressed the commitment of the new Administration to meeting the basic human needs of the world's poor. He noted that development requires action by both the developed and the developing nations and emphasized the need for effective domestic policies in the developing countries. The Secretary expressed support for the new directions being charted by the World Bank in financing social and economic development and the increase of Bank lending for the expansion of the energy resources of the developing countries.

IBRD General Capital Increase: In order to enable the IBRD to continue to increase its lending program in real terms into the next decade, Bank management, in February 1977, proposed a general capital increase with formal consideration by the Board of Executive Directors to commence later in the year, after the IBRD's Annual Meeting. The President of the Bank hopes to reach agreement on a capital increase by June 1978, with the actual payment period for the increase becoming effective in 1981 or 1982.

The questions which need to be addressed in discussing this proposal are basic, and affect the future role of the IBRD. These include: How should the Bank fit into the prospective pattern of external finance? What should be the Bank's role in relation to the other major sources of development funds? Is there a need for major shifts in the direction of Bank lending either among countries or among sectors? How rapidly should the Bank grow? How serious are the constraints imposed by the Bank's capacity to borrow or to deal effectively with the administrative effects of continued growth?

The new Administration believes that United States participation in the Bank's general capital increase is an important element in U.S. foreign assistance policy. With a substantial capital increase, the Bank can continue to be a major source of capital for the developing countries and play an indispensable role in promoting productive long-term investment. Equally important is the Bank's ability to promote sound domestic policies in developing countries during a crucial period for the world economy.

IDA Country Allocations: During the negotiations for the Fifth Replenishment of IDA, the United States raised a question as to the economic criteria appropriate to the allocation of IDA resources. IDA credits have, in the past, been allocated on the basis of four principal criteria: (a) poverty (as measured by per capita income); (b) creditworthiness (as judged by the ability to borrow elsewhere); (c) performance (as indicated by the development effort being made by the country); and (d) project availability (the need for sound development projects after the country has otherwise been qualified).

These criteria have not been reviewed since 1973. Changes in the world economic and financial environment since that time (e.g., higher oil prices), however, suggest the need for a fresh look at the criteria suitable for IDA credit allocation decisions.

As a result of this U.S. initiative, IDA donor countries have agreed to place greater emphasis in the future on four particular factors: (a) the need to address "pockets of poverty" even in the slightly better-off IDA countries; (b) development of more projects aimed at the chronic energy and food deficit problems of the developing world; (c) the deterioration of the debt service situation since 1973; and (d) the use of a more consistent blend of concessional IDA credits and IBRD funds for the countries at the upper end of the IDA eligibility scale. These factors have been taken into account in the process of deciding on new IDA credit commitments beginning July 1, 1977 under the IDA Fifth Replenishment Period.

Inter-American Development Bank Program and Resources

During 1977 the Inter-American Development Bank (IDB) committed $1,316 million of resources, a 7 percent increase over the level recorded in fiscal year 1976. Of this amount, $662 million was lent by the IDB on conventional terms from the Ordinary Capital account and $584 million on concessionary terms from the Fund for Special Operations. In addition, the Bank committed $70 million in resources from funds it administers for various donors (such as the Venezuelan Trust Fund). Cumulative lending by the IDB, as of June 30, 1977 was $10.3 billion—$4.8 billion from the Ordinary Capital account, $4.7 billion from the Fund for Special Operations, and $0.8 billion from other resources (primarily the United States Social Progress Trust Fund).

Agriculture, industry and transportation projects received the greatest attention by the IDB in 1977. Approximately 39 percent ($418 million) of resources committed were for agricultural sector projects, 18 percent ($225 million) for industry and 17 percent ($211 million) for transportation. On a cumulative basis through June 30, 1977 the agricultural sector had received 24 percent ($2.5 billion) of total IDB lending. Power projects had received the next largest amount, 20 percent or $2.1 billion. (In some instances, however, distribution of loans into sector categories such as this may tend to be misleading since many IDB projects are of a multi-purpose character—i.e., dams may benefit rural areas through irrigation as well as through electric power generation).

The IDB lending program is financed principally with resources from paid-in capital subscriptions of member countries, borrowings in world capital markets, and member country contributions to the Fund for Special Operations (FSO). As of June 30, 1977, the total subscribed capital of the Bank was $8,896 million, of which $1,256 million was paid-in and $7,640 million was callable. FSO resources amounted to $5,881 million. United States subscriptions to IDB capital shares amount to $3,105 million, or 35 percent of the total. Including contributions authorized, but still pending appropriation, the United States has accounted for $3,400 million or 68 percent of total resources contributed to the FSO.

During 1977, the IDB borrowed $393 million (equivalent) on international capital markets, including $200 million in the United States. In addition, the Bank sold $20 million of 2- and 5-year bonds to central banks in Latin America. The outstanding funded debt of the Bank was $2,177 million as of June 30, 1977.

Pursuant to the lending rate policy adopted in September 1976 the IDB's lending rate was set at 8.6 percent for the remainder of 1976. On January 1, 1977 the rate was adjusted down to 8.35 percent to reflect lower Bank borrowing costs and on July 1, 1977 the rate was reduced to 8.0 percent, reflecting the continuing decline of the Bank's borrowing costs.

Inter-American Development Bank—Major Issues and Developments

Annual meeting: At the eighteenth annual meeting of the IDB held in Guatemala City in May 1977, the United States Governor of the Bank (Secretary of the Treasury Blumenthal) stressed the new Administration's support for the international development banks, the concern of the United States that the IDB and the other development banks continue to improve the effectiveness of their loan programs in promoting economic and social development, and the interest of the United States in working with other countries to meet the basic human needs and promote the dignity of the people of the developing world.

The United States Governor also commended the IDB on its contributions toward development in Latin America and made a series of suggestions for improvements and new directions in the Bank's programs. He referred to the President's reaffirmation of U.S. support for regional and subregional integration efforts in Latin America, and encouraged the IDB to expand its efforts to develop indigenous resources to help satisfy Latin American energy and raw materials needs, to continue support for the private sector, and to encourage mobilization of domestic savings through lending to credit unions, cooperatives and savings and loan associations.

Replenishment and Nonregional Membership: On June 1, 1976 a major replenishment of IDB resources totaling $5.0 billion for the period 1976 to 1978 was approved. Under the terms of this replenishment agreement, the regional member countries (including the United States) would increase their capital subscriptions by $4 billion during that period, comprising $344 million in paid-in capital and $3,656 of callable capital. Over the same period these countries also pledged to contribute $1,045 million to the Fund for Special Operations. An additional $1.3 billion in callable capital stock is planned for 1969, after final commitments on the callable portion of the $4 billion increase have been made.

During the 12-month period ending June 30, 1977, the regional members of the Bank subscribed $2,161 million in capital and contributed $308 million to the FSO, meeting the first and second installments to capital and the first installment to the FSO under the current replenishment.

In conjunction with this resource replenishment, membership in the IDB was expanded to include donor countries from outside the Western Hemisphere. During the 12-month period ending June 30, 1977, 15 countries (13 in Europe plus Japan and Israel) joined the IDB, pledging to subscribe $436 million to the Bank's capital and to contribute an equal amount to FSO resources.

Asian Development Bank Program and Resources

United States participation in the Asian Development Bank is an important element in our foreign economic policy in East Asia and the South Pacific. Forty-two countries, both regional and nonregional, are members of the ADB and many of the Bank's borrowers are countries of particular political and economic importance to the United States.

During 1977, the Asian Development Bank lent $492 million to its borrowing member countries, a 44 percent decline over lending in fiscal year 1976. This seeming sharp drop in ADB lending was due to the fact that a much larger proportion of the Bank's calendar year 1976 lending program was approved between January and June of that year (thereby inflating the U.S. fiscal year 1976 figure) than was approved during the first half of calendar year 1977. The growth in lending during the Bank's most recently completed fiscal year was 17.5 percent over the preceding year's level. Of its loans in 1977, $289 million was funded with Ordinary Capital resources and $203 million with concessional funds. Lending in 1977 brought cumulative ADB loans through June 30, 1977 to $3,436 million—$2,495 million from Ordinary Capital and $941 million on concessional terms.

During 1977, agriculture and agro-industry continued to be the largest beneficiary sectors of Bank lending, accounting for $159 million, or almost 32 percent of total lending. This proportion represents an increase of 2 percent in the share of funds lent to agriculture (as compared with the 30 percent of total commitments in this sector in fiscal year 1976) and reflects the Bank's ongoing efforts to direct more assistance to Asia's rural poor. Since the inception of the ADB in 1966, public utilities have received the largest amount of ADB loan funds ($1,132 million, or 33 percent) followed by agriculture and agro-industry ($821 million or 24 percent), industry ($772 million or 22 percent), and transportation and communications ($683 million or 20 percent).

The four largest borrowers from ADB Ordinary Capital resources in 1977 were the Philippines ($67 million or 23 percent), Korea ($62 million or 21 percent), Malaysia ($52 million or 18 percent), and Indonesia ($50 million or 17 percent). These four countries received 79 percent of Ordinary Capital lending in 1977. Bangladesh and Nepal were the two largest recipients of ADB/ADF concessional lending, borrowing $69 million (34 percent) and $50 million (25 percent) respectively during the period.

ADB Ordinary Capital lending operations are financed with resources from paid-in capital subscriptions, funds borrowed in world capital markets and from governments and central banks, repayments of principal and interest on loans, and net earnings on investments. Asian Development Fund resources—used for concessional loans—derive from member country contributions, amounts set aside from Ordinary Capital earnings, and repayments on loans.

As of June 30, 1977, the subscribed Ordinary Capital stock of the ADB totaled $3,668.5 million. The Executive Branch request for a third and final United States installment of $120.6 million to the first Ordinary Capital increase was approved in September 1976, and the United States subscribed this amount on December 1976, raising the total United States capital share to $603.2 million. Total resources of the Asian Development Fund amounted to $1,067.1 million as of June 30, 1977. Negotiations began in late 1977 on a third replenishment of resources for the Fund (ADF III) in order to finance its lending activity in the period 1979 to 1982.

During 1977, the ADB borrowed $220 million in international capital markets, raising $145 million in the United States, $42 million in Germany and $33 million in Switzerland. Because of lower borrowing costs during 1977, the ADB lowered its lending rate on Ordinary Capital loans on November 10, 1976 to 8.9 percent (from 9.1 percent) following a similar 20 basis point reduction of the IBRD lending rate. This rate held until February 1977 when, following a review of the Bank's financial policies and charges, the ADB set its 1977 lending rate at 8.7 percent. This 8.7 percent rate held until August 1, 1977 when it was reduced to 8.3 percent, again reflecting reduced borrowing costs in world capital markets.

Asian Development Bank—Major Issues and Developments

Annual Meeting: At the Tenth Annual Meeting of the ADB Board of Governors in April 1977, the new Administration expressed the continuing support of the United States of the objectives and operations of the Asian Development Bank, in particular, the Bank's increasing efforts to assist rural development through the introduction of integrated rural development projects, and the special attention being paid by the Bank to the use of appropriate technology. United States representatives at the meeting urged the Bank to pay special attention to financial policies so as to preserve the Bank's well deserved reputation for fiscal prudence and administrative austerity. They also detailed the efforts being made by the new Administration to meet fully the resource pledges made by the United States to the Bank.

Ordinary Capital Increase: On October 15, 1976 the ADB Board of Governors ratified a 135 percent increase of the Bank's capital subscriptions. This replenishment became effective on September 30, 1977. The capital increase amounts to $5,003 million and consists of 10 percent paid-in capital and 90 percent callable capital. The share of the United States in this capital increase is $814 million.

African Development Fund Program and Resources

The African Development Fund (AFDF), created on July 3, 1973, is the concessional lending affiliate of the African Development Bank. The AFDF is designed to channel resources to the poorest African nations and, except in the most unusual circumstances, its loans are not extended to countries with per capita GNP in excess of $400 (equivalent).

The United States joined the AFDF in November 1976 with a contribution of $15 million. In addition to the United States, membership in the AFDF includes 12 European countries, Canada, Brazil, Japan, Saudi Arabia, and the African Development Bank which has no nonregional members.

In 1977, AFDF lending amounted to $118.2 million, distributed among 15 African countries. This represented an increase of $25.4 million, or 27.4 percent, above the 1976 lending level of $92.8 million. Tanzania was the largest borrower ($14.4 million) having received 12.2 percent of the year's loans; Rwanda ($13.8 million) received 11.7 percent; Malawi ($11 million) received 9.4 percent; and Mali ($10.8 million) received 9.1 percent.

AFDF lending in 1977 helped to finance projects in health, water supply and sewerage, agriculture and rural development, and education and transportation. Agricultural projects accounted for the largest sectoral share of AFDF lending at $37.0 million, or 31.3 percent of total lending. The two other leading sectors benefiting from AFDF loans were water supply projects ($31.9 million or 27.0 percent of total lending), and transportation, particularly road construction which received $27.4 million, or 23.2 percent of lending.

The United States initial contribution of $15 million increased total resource pledges to the AFDF to $410 million (as against inaugural pledges of $100 million in 1973). As of June 30, 1977, total contributions received by the AFDF had amounted to $363 million. At the current rate of commitment, AFDF resources will be exhausted in 1978. In order to finance a continuation of the AFDF lending program during the period 1979 to 1981, member countries met in London in late 1977 to commence discussions of a major replenishment of AFDF resources.

African Development Fund—Major Issues and Developments

Annual Meeting: The fourth annual meeting of the African Development Fund, held in Mauritius in May 1977, was the first which the United States attended as a full-fledged member. The representative of the United States expressed the new Administration's support for the African Development Fund as a means of addressing African aspirations for a better life and a fair share in the fruits of the international economic system. The United States also indicated its intent to assume an appropriate role in funding the AFDF during the second replenishment of its resources and supported the creation of the Review Committee.

Review Committee: During 1977 the Board of Directors of the AFDF voted to conduct a major review of Fund activities from the inception of operations to the present time. A panel of five internationally-distinguished development experts was assembled to conduct this review over a 6-month period, commencing June 1977. The Review Committee is considering all aspects of AFDF policy and operations, conducting extensive interviews with AFDF staff, management, and members of the Board of Directors. Individual committee members are also visiting borrowing, as well as donor, countries to assess AFDF effectiveness and potential. The Committee's final report is expected to embody a comprehensive series of recommendations for improving AFDF operations together with guidelines for the Fund in the future.

Disbursement Policy Study: The Board of Directors of the AFDF also voted to engage an experienced management consulting firm to review AFDF disbursement policies and procedures. The relatively low level of disbursement (equal to 8.3 percent of total funds committed as of June 30, 1977) suggests the need for accelerating the Fund's tangible impact on African development. This consultant's report will be used as a guide to streamlining the administrative procedures governing AFDF project implementation.

International Fund for Agricultural Development

During 1977 arrangements for establishing the International Fund for Agricultural Development (IFAD) neared completion. The objective of this new organization is to develop and finance projects to promote food production through emphasis on helping small farmers in developing countries. The $1 billion pledge target prerequisite to opening the IFAD Articles of Agreement for signature was passed during the period under review and a number of countries deposited their instruments of ratification. A United States pledge of $200 million will be the largest single contribution to IFAD. OECD countries as a whole have pledged $567 million as compared with $435 million from OPEC countries and $9 million in convertible currencies from non-oil developing countries.

Three meetings of the IFAD Preparatory Commission were held during the year to set forth basic policies and procedures to guide IFAD operations. The work accomplished at these meetings should make possible prompt commencement of lending activity after the first meeting of the IFAD Governing Council in December 1977. The IFAD Articles of Agreement provide that it is to rely on existing international institutions to appraise, administer, and supervise implementation of projects. In addition, a number of IFAD's first projects are likely to involve co-financing projects already prepared by the IDLIs.

All of IFAD's resources are to come from member contributions—IFAD will not borrow from private capital markets. Up to one-eighth of its funds may be used for grants and the balance will be for concessional loans, the bulk going to the poorer developing countries at terms close to IDA terms.

TOPICS OF SPECIAL INTEREST TO THE UNITED STATES

Review of International Development Banks' Policies

Reflecting the importance of the development banks to United States relations with the developing countries, the Treasury Department is undertaking an in-depth review of the effectiveness of these institutions in achieving their own objectives and the objectives of the United States and how U.S. objectives can best be pursued in the IDLIs. The Treasury study will investigate how the international development banks facilitate: (a) bringing the developing countries along into an open, flexible, dynamic world economic order; (b) furthering global and developing country adjustment processes; (c) reaching the poor through "basic human needs"-type projects; (d) influencing developing country development strategies; and (e) advancing the President's human rights strategy.

Human Rights

President Carter's strong support for advancing the cause of human rights and intensified Congressional interest as well have caused human rights to become a priority element in United States foreign policy and an important factor in the U.S. position *vis-a-vis* the international development banks. (Recent legislation on the advancement of human rights has been noted earlier in this Chapter of the Council's Report.)

Essentially, the United States believes that its support for loans by the international development banks should take into account the human rights policies of borrowing member countries. It believes that the banks should channel assistance to countries other than those which engage in a consistent pattern of gross violations of internationally recognized human rights. Although the United States, acting alone, is not able to block a loan it opposes on human rights grounds—except in the Fund for Special Operations of the IDB, where the U.S. has a veto—United States opposition provides a clear indication of the importance it attaches to improving human rights conditions worldwide.

At the same time, there is a presumption that United States opposition to development bank loans should be used sparingly and be part of a broader strategy for advancing the cause of human rights in specific countries. Therefore, it is generally used in conjunction with other bilateral efforts, including the level of U.S. bilateral foreign assistance.

The Executive Branch considers each individual IDLI loan and assistance proposal, as well as each U.S. bilateral assistance program, from the standpoint of current human rights conditions in recipient countries through a permanent Inter-Agency Group on Human Rights and Foreign Assistance, chaired by the Deputy Secretary of State.

Light Capital Technology

Reflecting both their own initiatives and the strong initiatives taken by the United States on this subject, the international development banks have taken a number of steps to develop and implement light capital technologies as a major facet of their development strategies.

The IDLIs have reviewed previous projects which they have financed and evaluated the technologies used in order to determine appropriateness in the context of the needs of the developing countries. The IDLIs found that many of the projects which used light capital technologies have proven useful in formulating new approaches to addressing the technological needs of the poorer nations. Units or groups within the IDLIs have continued and expanded programs in this area. For example, the World Bank has undertaken a multi-year comparative study of different technologies in civil construction with particular focus on road and irrigation works. This type of study is being expanded into other sectors. The IDB has also established a special internal committee to study appropriate technologies.

As required by Section 29 of the Inter-American Development Bank Act, the United States Executive Director of the IDB proposed to the Bank's Board of Executive Directors a resolution making the development of light capital technologies a major component of IDB development strategy and in November 1976, the IDB Board approved a policy statement on this subject. A progress report on IDB use of light capital technology was transmitted to Congress in May 1977 pursuant to legislation. Reports on the past and present efforts of the other IDLIs in the area of light capital technology have also been supplied to the Congress by the Executive Board.

Minerals and Energy

In October 1976 the United States requested the World Bank to review a proposal for the creation of an International Resources Bank and other possible mechanisms for increasing investment in minerals and energy in the developing countries. Pursuant to this request, the Executive Directors of the IBRD reviewed Bank policy on investment in the energy and mineral sectors at the end of June 1977. During the Board discussion, the United States made clear its view that the World Bank should act as a catalyst for, and not as a guarantor of, contracts between private companies and member countries. The United States also indicated that it did not believe that oil and gas exploration were appropriate areas for IBRD lending because of the many difficulties in allocating the costs of unsuccessful exploration efforts.

The policy adopted by the Bank in the energy and mineral field is compatible with the objectives of the United States. Basically, the Bank proposed to provide financing in the range of $300 million in the energy sector and approximately $800 million in the minerals sector during the period 1977 to 1980. The Bank will also act as a catalyst for private investment in these areas and will help rationalize and improve developing country policies and planning in the energy and minerals sectors.

The United States, together with other member countries of the IBRD, has stated that the proposed increase in lending for energy should not impinge on Bank lending programs in other sectors. Although the Bank believes that the increase in lending for energy would not require a rearrangement of priorities, the United States and other donors have reserved the right to consider this policy further in the context of the proposed general capital increase for the Bank, the size and conditions of which remain to be negotiated.

Salary Levels and Administrative Costs

The level of remuneration in the international development banks continued to be a highly visible issue during the period covered by this *Annual Report* of the National Advisory Council, receiving attention from Congress, the Executive Branch and the press. The United States, as in previous years, was able to defeat some proposed salary increases regarded as excessive, and in other cases was able to reduce proposed increases sharply. This was accomplished through high-level representations to other member governments and to the managements of these institutions.

In the spring of 1977 the United States was successful in convincing management to reduce the magnitude of proposed increases of staff salaries in the IMF and the IBRD. Management also withdrew a proposal to introduce the payment of expatriation allowances to non-U.S. staff, pending a thorough review of compensation issues by a Joint Committee of Executive Directors. A small decrease in a proposed staff salary increase was also obtained at the ADB through a United States initiative.

In July 1977 the United States led a successful effort to defeat a proposed increase of salaries for Executive Directors and Alternate Directors, at both the IMF and IBRD. This was the third year in succession that the United States had successfully defeated an initial proposal to increase the salaries of these officials. In the previous years, more modest salary increases were eventually adopted.

The Congress continued to evince its concern in these matters by qualifying U.S. contributions to the IBRD, IDA, IDB, and ADB with the condition that the U.S. Executive Directors of these institutions not receive compensation in excess of that paid to a U.S. Government Executive Level IV (e.g., Assistant Secretary) position and that the U.S. Alternate Executive Directors not receive compensation in excess of a U.S. Government Executive Level V (e.g., Deputy Assistant Secretary) position.

The new Joint Committee on Compensation Issues of the IBRD and IMF, composed of Executive Directors and including outside experts, has been formed to recommend the appropriate principles and levels of compensation at those institutions. The Secretary of the Treasury had also proposed that the finance ministries of the United Kingdom, France, Germany and Japan join with the United States in sponsoring a similar study by a firm of outside management consultants. The other governments have accepted the offer to join in sponsoring the study, and it is hoped this will be completed in time to have some impact on the final decisions of the Joint Committee and on salary proposals during fiscal year 1978. (The United States also continued to urge budgetary restraints on the development banks, and was at year-end conducting a review of IMF and IBRD travel practices with the intent of urging economy measures.)

IDLI Project and Performance Evaluation

(Previous *Annual Reports* of the NAC have described the origins and development of the systems of project and performance evaluation of the IBRD, IDB and ADB in some detail.)

The IBRD's Operations Evaluation Department (OED) completed 103 Project Performance Audit Reports (PPARs) during the period July 1976 to September 30, 1977. Sectors covered included public utilities, transportation, agriculture, development finance corporations and program loans to industry. The OED also completed three Operational Policy Reviews which, rather than evaluating single projects, covered related projects in several countries from a wider economic perspective. As in previous years, the OED also reviewed the results of its previous year's work. These reviews take two forms—Annual Reviews of Project Performance Audit Results (this being the third) and Annual Reports on Operations Evaluation (this being the second). These reports are reviewed by the NAC agencies in the regular course of their work.

The first review summarizes the findings of the individual PPARs issued in calendar 1976. Subjects covered are: comparisons of estimated with actual project costs and reasons for major cost changes, comparisons of estimated project completion times with actuals and reasons for extensions, comparisons of estimated with actual economic rates of return, and the results of the Bank's efforts in institution building. More general conclusions are drawn with respect to the Bank's approach to its lending operations, to the effectiveness of consultants, to its increasing experience with repeater projects, and to the operational uses of the reviews.

The second review describes the expanding use of the OED's findings by operational staff. Members of both the Central Projects Staff and the regional projects departments review OED's reports to assess their applicability to current operational policy and practice. The utility of such reviews is particularly stressed in the evaluation of repeater projects.

During the period July 1, 1976 and September 30, 1977 the Group of Controllers of the IDB completed reports on "IDB Training Activities," "Policies of the Bank re Procurement of Goods and Services," "Consulting and Contractual Services, 1976 Administrative Budget" and "Loan Application Appraisals." As in past years, recommendations for implementation by management were derived from these reports. Management is given the opportunity to comment on such recommendations and, after review and endorsement by the Board of Directors, Management is charged with their implementation. Over time, the Group monitors the implementation of the recommendations and semi-annually reports to the Board on its status. This is a continuing process covering all reports since the establishment of the evaluation system. Also, in accordance with established procedures, the Group submitted its proposed Work Program for 1978 to the Board for its comments and approval. While the Group has so far concentrated mainly on analyzing and evaluating the Bank's administrative and implementational procedures, the new work program calls for evaluations of actual project implementation. This will be done by selected sectors, each report covering projects in several countries.

The ADB completed seven project evaluations during the period covered by this Report. Three were performed by outside consultants and four by the Bank's Economic Office. In addition to normal assessments of the quality of physical completion of projects and the accomplishment of their economic and financial objectives, other implementation factors reviewed were the adequacy (both in number and composition) of Bank review missions, the achievement of income-creation opportunities, compliance with agreed loan covenants, quality of the original project appraisals as viewed from the advantage of acquaintance with the projects' actual performance, the degree of emphasis on institution building and evaluation of the results, and the Bank's own performance throughout the project planning and implementation process. The ADB also has procedures for receiving comments from borrowers, project managements, concerned government agencies, and Bank staff and follow-up actions on recommendations contained in the reports are periodically reviewed.

As discussed in an earlier section of this Chapter, the activities of the African Development Fund are being examined by an independent review committee and also by a private management consulting firm. The AFDF has also begun to develop plans for a new system to monitor project implementation.

INVESTMENT STATUS OF IDLI BONDS

Pursuant to provisions in the Acts authorizing United States participation in the international development banks and to amendments to the National Bank Act, member banks of the Federal Reserve System are permitted to underwrite and deal in the securities of the development banks for their own account within defined limits. Although the IDLIs file annual reports with the Securities and Exchange Commission, securities issued or guaranteed by them are exempted by statute from the Securities Act of 1933 and the Securities Exchange Act of 1934. The provisions of law just described facilitate to an extent the sale of bonds by the respective institutions, and the National Advisory Council does not recommend any modifications of the statutes.

In addition to Federal legislation facilitating the sale of bonds by the development banks, State laws provide for the purchase of such bonds as legal investments by various financial institutions. The status of qualification of international development bank bonds for this purpose is summarized in Table 8.

TABLE 8.—*Number of States*[1] *in which the Securities of the International Development Banks are Qualified for Investment by Financial and Fiduciary Institutions as of September 30, 1977*

Eligible Institution	International Bank for Reconstruction and Development	Inter-American Development Bank	Asian Development Bank
Commercial banks	50	50	50
Savings banks[2]	29	32	30
Insurance Companies:			
Life	50	47	49
Other	48	44	46
Trust Funds	48	48	49
State and local pension funds	40	43	41

[1] The securities of the International Bank for Reconstruction and Development and of the Inter-American Development Bank are eligible for investment by all of the listed institutions in the District of Columbia except for pension funds which must be invested in U.S. Government securities. The securities of the Asian Development Bank are eligible for investment by all of the listed institutions in the District of Columbia except for life insurance and fire and casualty insurance companies and pension funds.

[2] Savings banks exist as a separate category of savings institutions in 33 States.

V. TRADE, TRADE POLICY AND TRADE FINANCE

- The world trading community faced serious challenges during 1977 as it attempted to finance large energy-induced trade deficits and to stem growing domestic pressures for protectionist measures. Despite these difficult circumstances, however, the United States successfully managed several domestic import problems in cooperation with foreign suppliers and joined its principal trading partners in achieving a major procedural breakthrough toward further trade liberalization progress in the Multilateral Trade Negotiations (MTN).

- The major emphasis of U.S. trade policy continued to be a basic commitment to free trade and further substantial trade liberalization and, at the London Economic Summit Meeting in May 1977, the leaders of seven principal countries reaffirmed their commitment to the avoidance of protectionist trade measures which could "foster unemployment, increase inflation, and undermine the welfare of our peoples."

- The international Consensus to reduce counter-productive competition among national official export credit agencies (including Eximbank), instituted in July 1976, which established guidelines for cash payments, interest rates and repayment terms, was extended by mutual agreement until December 31, 1977. Active efforts are underway to conclude an improved international arrangement on export credits as endorsed by the Heads of State at the London Economic Summit Meeting.

- During the Transition Quarter (July–September 1976) and the first nine months of U. S. fiscal year 1977 (October 1976–June 1977), the Export-Import Bank authorized $5.7 billion in loans, guarantees and insurance. Loans authorized during this period carried an average interest rate of 8.63 percent, compared with an average cost of funds to the Eximbank of 7.3 percent.

- Changing supply and demand conditions were the primary causes of price volatility in major world agricultural commodity markets (soybeans, cotton, coffee and cocoa) during 1976/77. Prices for these commodities rose sharply in the spring of 1977 but price pressures subsided in ensuing weeks as demand slackened somewhat and prospects for larger crops next season began to materialize.

- The worldwide economic recovery which began in late 1975 was less vigorous than anticipated and, as a consequence, the industrial commodities market situation was mixed, with early advances followed by declining prices for most industrial raw materials. The increased tempo of economic activity has apparently not been such as to lead to substantial reductions in existing large stocks of some industrial materials—notably copper and zinc.

- The United States modified its previous stance on international commodity problems during 1977 by constructively seeking to negotiate international commodity agreements and a common fund to help finance agreements which operate through international buffer stocks. The U.S. believes that the benefits of this approach will accrue to all countries and should encourage more stable economic growth, the expansion of employment opportunities worldwide and lead to more viable external payments positions for poor and wealthy countries alike.

THE WORLD TRADE ENVIRONMENT IN 1977

The international trading community continued to face serious challenges during 1977 in its attempts, on the one hand, to finance substantial energy-induced trade deficits and, on the other hand, to stem growing domestic pressures for protectionist measures. Despite these difficulties, the United States was successful in managing a few serious domestic import problems in cooperation with major foreign suppliers and joined its major trading partners in achieving a significant procedural breakthrough to enable further progress toward substantial trade liberalization through the Multilateral Trade Negotiations (MTN).

Global economic recovery continued at a relatively gradual pace during the year—rates of growth varied considerably as among the developed countries while high unemployment and persisting inflationary pressures remained serious problems. Because of higher imports of some goods, domestic pressures for restraints on trade among developed countries became particularly heavy in several key sectors, including steel, textiles, electronics, footwear, and shipbuilding.

In Europe, these pressures led to a number of bilateral consultations between the European Economic Community (EC) and Japan which resulted in restraints on Japanese exports of steel to the EC and automobiles to the United Kingdom. The Multifiber (Textile) Agreement, due to expire at the end of calendar year 1977, became an additional target of efforts to restrict further growth in imports. The EC and Canada (both signatories to the Agreement) took unilateral restrictive actions outside the Agreement, arguing that it was inadequate to meet their needs.

As the U.S. economy continued to lead the recovery and to assume a larger share of the massive payments deficit, our trade balance shifted into deficit, from a surplus (balance of payments basis) of $9 billion in 1975 to a $9.2 billion deficit in 1976. A U.S. trade deficit in the range of $25 to $30 billion came into prospect for calendar year 1977. Major import cases before the U.S. International Trade Commission (ITC) on shoes, televisions and sugar, coupled with efforts (through court challenges to Treasury rulings) by the steel and television industries to force the Treasury Department to impose countervailing duties posed major international trade policy challenges for the new Administration.

The Multilateral Trade Negotiations (MTN) recorded but little substantive progress during the first half of U.S. fiscal year 1977. Differences between the United States and the EC over the nature of negotiations on agricultural products continued to be a major roadblock to progress in negotiations in other areas as well. Domestic problems and pressures and sluggish economic growth tended to dampen enthusiasm for these negotiations in many countries, some of which sought to turn the thrust of the MTN away from a major liberalization of trade to the approval of selective safeguard measures and the organization of markets in certain sectors.

By early summer, 1977, with the successful conclusion of the Economic Summit Meeting in London, the renewal of the OECD Trade Pledge, and significant progress made in establishing an agreed schedule of negotiations in the MTN, the prospects for maintaining and further liberalizing the international trade environment appeared to have improved substantially. Mutual cooperation, discussion of common sectoral problems, and a renewed commitment to the avoidance of protectionist trade policies were continuing to be recognized as crucial elements in heightened global economic interdependence.

TRADE POLICY DEVELOPMENTS

United States Initiatives

The major emphasis in the trade policy of the United States during the period covered by this *Annual Report* of the Council remained its basic commitment to free trade and to further substantial trade liberalization through the MTN. The London Economic Summit Meeting in May 1977 provided an excellent opportunity for the leaders of seven major developed countries to reaffirm their commitment to the avoidance of protectionist trade measures which would "foster unemployment, increase inflation, and undermine the welfare of our peoples" and to "give new impetus to the Tokyo round of multilateral trade negotiations," aiming for substantive progress in the MTN during 1977.

In support of these London Summit commitments, vigorous efforts were made to resolve the United States-EC impasse on agricultural negotiations in the MTN. In July the U.S. Special Trade Representative (STR) announced a major breakthrough on this front: the United States and the European Community had agreed on procedures for moving the negotiations forward by having all requests and offers on the table by January 15, 1978. It was expected that all agricultural requests, tariff requests for non-formula countries, and non-tariff measure requests not related to the multilateral codes would be tabled by November 1, 1977. An agreement on a tariff cutting plan was targeted for October 1, 1977 as was also the handling of exceptions. Draft codes on subsidies/countervailing duties, government procurement, customs valuation, automatic licensing procedures and standards were expected to be submitted before the end of the calendar year.

In June 1977 the United States joined other member countries of the OECD in reaffirming the commitment to the OECD Trade Pledge for the third consecutive year. This Pledge reflects the mutual determination of participating countries to avoid the imposition of trade or other current account restrictions for balance of payments reasons and to cooperate in seeking common solutions to sectoral problems. The United States considers renewal of the OECD Trade Pledge to be of particular importance at a time of increasing protectionist pressures.

Generalized System of Preferences (GSP)

In January 1976 the United States joined 22 other preference granting developed countries and instituted a Generalized System of Preferences (GSP) for the benefit of developing countries. The United States GSP provides for duty-free treatment, within specified limits, of imports of a wide range of products (chiefly semimanufactures and finished manufactured goods, but also including agricultural and fishery products) from about 100 developing countries and 40 territories or non-independent countries. This system is to remain in effect until January 3, 1985.

During calendar year 1977 the United States imported approximately $3.9 billion worth of goods duty-free from beneficiary developing countries under this Generalized System of Preferences. Nearly 2,800 items are currently eligible for preferential treatment under the GSP, the composition of the list of eligible items being subject to change through the exercise of Presidential authority to add or delete products. (In the first 2 years of the program 57 products were added and only 6 were removed.) Taiwan, Korea, Hong Kong, Mexico, and Brazil were the major beneficiaries of our GSP in 1977. A major interagency review of the United States GSP which took place during the summer of 1977 led to new procedures for beneficiary developing countries to petition for product additions to the GSP list.

Special Import Problems

Special problems were raised during 1977 in a number of domestic import sectors, including, in particular, televisions, shoes, steel, and Rhodesian chrome. Responding to industry complaints, the U.S. International Trade Commission (ITC) determined that imports of televisions and shoes either threatened, or had caused substantial injury to, domestic firms and workers. As a consequence, the ITC recommended imposition of a tariff quota for shoes and a substantial increase in tariffs on television imports. The President, however, decided instead to seek the negotiation of orderly marketing agreements (OMAs) with major foreign suppliers as being a less restrictive response to a serious problem facing American industry. The President also ordered a Trade Adjustment Assistance Program for the shoe industry (see below).

President Carter's decisions in both of these cases were clear signals that the new Administration was opposed to unilateral protectionism although it fully recognized the need to cushion the domestic impact of liberal trade policies under certain exceptional circumstances. Mutual cooperation to moderate sudden disruptive shifts in trade was considered to be clearly preferable to unilateral quota or tariff restraints, and even this remedy would be pursued only in critical situations.

Under the shoe OMAs, the Republics of Korea and China will reduce their combined average annual exports to the United States over the next four years to a level of almost 20 percent below 1976 U.S. import levels. Under the television OMA, Japan is to limit annual exports of complete color receivers to the United States over a 3-year period to about two-thirds of 1976 levels. Restraints were not applied on imports from other suppliers of these items because the sharp increases in imports found to have injured the competing U.S. industries came almost wholly from the Republics of China and Korea (shoes) and from Japan (televisions). Should imports from other suppliers increase sharply and disadvantage countries which have already signed OMAs, the United States Government could apply additional restraints.

The decision to negotiate a temporary Orderly Marketing Agreement for U.S. imports of shoes from Taiwan and Korea was coupled with the announcement of a major new Federal adjustment effort to assist the American footwear industry. The President also directed that a complete review of the entire Trade Adjustment Assistance (TAA) Program be undertaken, promised to find ways of ensuring that the TAA Program is more effective and responsive, and to submit proposals on this subject to Congress. In early July, the Commerce Department announced a $56 million TAA Program for the footwear industry, including new loans and grants, training assistance, and other steps designed to upgrade significantly the industry's technological level and competitive position. In September 1977, the President announced a major overhaul and expansion of all TAA Programs, including expanded and more equitable coverage, increased benefits for firms, workers, and communities, and streamlined administration. The total annual cost of the program should be in the $450 to $470 million range.

During the period covered in this report, a separate appeal was also made under the countervailing duty statute for the imposition of import restraints on consumer electronic products from Japan. Following a Treasury Department decision (January 1976) that the rebate of indirect taxes on exports from Japan did not constitute a bounty or grant, the Zenith Radio Corporation entered the case in the Customs Court, which ruled in April 1977, that the rebate was a subsidy and that the Treasury Department should impose countervailing duties accordingly. This decision not only involved over a billion dollars in trade, but also threatened to make the rebate of all indirect taxes by foreign governments countervailable—jeopardizing additional billions of dollars worth of trade as well as threatening a potential trade war among the major developed countries. The new Administration won an important reversal of the decision in the Court of Customs and Patent Appeals in July 1977. The U.S. Supreme Court has agreed to hear an appeal of this decision.

The United States Steel Corporation has also asked for a Customs Court determination as to whether the EC rebate of the tax on value added (TVA) constitutes a countervailable subsidy. About $1 billion of steel imports into the U.S. is involved in this case which is expected to go to trial later in 1978, pending the outcome of the Zenith case.

Because of common world-wide problems in the steel sector, the United States pressed for multilateral discussions on steel within the OECD to improve the understanding of mutual problems and to permit an exchange of views on possible ways and means of resolving these problems. The talks were formally initiated in July.

In September 1977 President Carter asked the Under Secretary of the Treasury to head a special interagency task force to address the broad range of steel industry problems and to develop a comprehensive policy program for his review by the end of November. This task force, working with representatives of the steel industry, labor, consumers, and Congress was charged with determining the nature of the problems involved and with proposing a feasible and effective industrial policy.

On March 18, 1977 Congress repealed the Byrd amendment, which exempted chrome and chrome-bearing products from the United States embargo against trade with Southern Rhodesia in accordance with United Nations sanctions. To set up a comprehensive national barrier against chrome products from Rhodesia, both direct and indirect shipments of chrome products to the United States had to be controlled. The United States began testing all imports of chrome and ferrochrome from South Africa to ensure that chrome from Southern Rhodesia was not included. The United States also asked other major users of chrome to implement similar procedures and to certify that their exports to the United States did not contain Southern Rhodesian chrome. After detailed technical consultations, the major foreign suppliers of chrome-bearing steels to the U.S. market have put into effect comprehensive programs to ensure that none of their exports to the United States contain Rhodesian chrome.

THE UNITED STATES IN WORLD TRADE

With the recovery of the developed countries from the trough of the recession, world trade in calendar 1976 was about 11 percent higher in value and 8 percent greater in volume than in 1975. Among the major developed countries, the advance in exports was paced by Japan with a 21 percent increase in value in terms of the dollar, Canada with a 17 percent rise, and Germany with 13 percent. Exports by the non-oil developing countries also rose substantially in value (by 18 percent) while sales by the other oil-exporting countries and by OPEC countries advanced about 21 percent.

U.S. trade rose to a record level as imports expanded rapidly (by 26 percent) and exports registered modest gains (up 7 percent) and the U.S. trade balance switched from a record surplus of $11.6 billion in 1975 to a deficit of $5.7 billion ($14.6 billion c.i.f.) in calendar year 1976.

Several reasons may be cited for the less vigorous advance in exports. Although economic activity abroad rose throughout most of 1976, sales of U.S. products were dampened by the lingering effects of the recession, particularly early in the year. Sales to the developing countries, which accounted for a disproportionate share of the increase in exports in the preceding year, were also noticeably weaker in 1976. Deliveries to the oil exporting countries were much less buoyant and exports to the non-oil developing countries declined. Investment spending in the developed countries which are our major export markets has been sluggish during the past two years, dampening demand for United States capital goods. Finally, although the recovery abroad had been underway for more than a year, the rebound has been sporadic and relatively weak.

The sustained growth of the American economy in 1976 generated an increased demand for foreign goods. Accelerated personal consumption expenditures and a sharp upturn in industrial production swelled purchases of consumer goods and industrial materials from abroad. A major factor in import growth last year was the sharp upswing in the inventory cycle, as stocks were rebuilt following the unprecedented decumulation in 1975. A large increase in demand for foreign petroleum, coupled with higher prices, added further to the U.S. import bill (a 28 percent increase in value) in 1976.

Table 9 summarizes data on U.S. export and import trade for the years 1975 and 1976.

TABLE 9.—*United States Trade, Trade Balance and Percent Change, by Major Product Category, 1975–1976*
[F.A.S. value basis]

	1975			1976			Percent Change 1975–1976	
	Exports	Imports	Balance	Exports	Imports	Balance	Exports	Imports
	(Billions of U.S. Dollars)			(Billions of U.S. Dollars)			Percent	
Total	107.7	96.1	11.6	115.0	120.7	— 5.7	7	26
	(100)	(100)		(100)	(100)			
Agriculture	22.1	9.4	12.7	23.3	11.2	12.1	5	19
	(20.5)	(9.8)		(20.3)	(9.3)			
Non-Agriculture .	85.6	86.7	— 1.1	91.7	109.5	—17.8	7	26
	(79.5)	(90.2)		(79.7)	(90.7)			
Fuels	4.5	26.5	—22.0	4.2	34.0	—29.8	—7	28
	(4.2)	(27.6)		(3.7)	(28.2)			
Manufactures .	71.0	51.1	19.9	77.2	64.8	12.4	9	27
	(65.9)	(53.2)		(67.1)	(53.7)			
Other	10.1	9.1	1.0	10.3	10.7	— 0.4	2	18
	(9.4)	(9.5)		(9.0)	(8.9)			

NOTE: Figures in parentheses represent percent shares of trade (exports-imports). Totals may not equal 100 percent due to rounding. Calendar years.

Source: Department of Commerce.

INTERNATIONAL TRADE FINANCE DEVELOPMENTS

Consensus on Export Credits

An international Consensus to reduce counter-productive competition among national official export credit agencies (including Eximbank) came into effect on July 1, 1976. The original Consensus of seven major trading countries, which established guidelines for cash payments, interest rates and repayment terms over a 1-year trial period, has since been extended by mutual agreement until December 31, 1977, and there are 20 participating countries plus the EC Commission. The United States agreed to the 6-month extension on the understanding that a new international arrangement on official export credits would be negotiated which broadens and strengthens the existing Consensus guidelines.

For many years national export credit agencies have recognized that an international credit race is undesirable. Beginning with the founding of the International Association of Export Credit Insurers (Berne Union) at the time of competitive currency devaluations in the 1930s, lenders have sought to foster the development of international trade along economically rational lines. Because the Berne Union is not an association of governments, the Organization for Economic Cooperation and Development (OECD) in the mid 1960s began to take an interest in export credit practices. With the onset of recession in 1971, exacerbated by the sharp increase in oil prices in 1973, there was renewed fear of a credit war as some governments, in order to maintain domestic employment and to support exports, offered increased export incentives.

The Consensus stems from the agreement reached at the Rambouillet Summit Conference in November 1975, at which the participating Heads of State declared they would intensify efforts to reduce export credit competition. (Further details on the origins and terms of the Consensus may be found in the *Annual Report* of the NAC for Fiscal Year 1976).

The OECD Ministerial Council in June 1976:

> "agreed to reinforce the Organization's activities concerning multilateral cooperation in the field of export credits in order to encourage the development of national practices in converging directions with a view to avoiding any excessive competition in official support of export credits and to examine these activities at regular intervals with a first report to be submitted to this end as soon as possible."

Current efforts to conclude an improved international arrangement on export credits were endorsed by the Heads of State at the London

Economic Summit Meeting in May 1977 and negotiations to achieve this objective have been completed.

The Consensus on export credit terms, although limited in scope, was an important first step toward reducing officially-supported export credit competition. Experience with the Consensus has been generally satisfactory. Nonetheless, it is clear that the Consensus was a limited understanding which required significant broadening and strengthening to more effectively reduce competition among national export credit agencies.

Interest Rates

Interest rates charged by Eximbank on newly authorized loans were reduced in January 1977 from a range of 8.0 to 9.0 percent. Rates begin at eight percent when the repayment period is less than six years from the date of authorization and increase 0.125 percent for each additional year of maturity up to nine percent on loans repayable in excess of fourteen years from date of authorization. The Bank's participation has generally ranged from 40 to 55 percent of the cost of the U.S. export, but the Bank has, on occasion, increased its participation, through a combination of direct credits and financial guarantees, to as high as 85 percent to meet foreign competition.

During the year reviewed in this Report, average Eximbank interest rates on officially-supported export credits were generally competitive with the rates of other national export credit agencies except those in France and Japan, which were typically lower. The French long-term rate was 7.5 percent. France typically covers 80 to 85 percent of the value of export transactions. The Export-Import Bank of Japan (JEIB) financed exports at rates ranging up to 9.0 percent with most credits at 7.5 percent. JEIB finances approximately 50 percent of the contract value.

A comparison of these national export credit rates, plus industrial bond yields is presented in Table 10 of this Report.

OECD Export Credit Group

The OECD Group on Export Credits (ECG) serves as a forum for member governments to discuss various aspects of official export credit programs, such as reducing competition on official export credits, establishing minimum cash payments and maximum terms and conditions for credits covering certain categories of exports, and for exchanging information on official export credit policies in general and for particular transactions so as to minimize counter-productive competition. During 1977 the National Advisory Council continued to assist in coordinating the U.S. Government position on topics discussed at the meetings of this OECD Group.

TABLE 10.—*Comparative Official Export Financing Interest Rates 1973–77*
[Percent, end of June]

	1973	1974	1975	1976	1977 (as of March 31, 1977)
Country Export Financing Rates:					
Eximbank Rate*	6	7	7.0–9.0	8.25–9.50	8.00–9.00
United Kingdom	6	6–8.5	7.0–8.5	7.00–9.00	7.25–9.00
France**	5.95–6.50	6.15–6.75	6.3–7.5	6.30–7.50	6.30–7.50
Germany**	7.25	8.75	6.0–8.25	5.00–8.50	5.00–8.75
Italy	6.5	6.5	8.0–9.5	8.00–9.00	8.00–9.00
Japan**	4–7	5.5–8.5	6.0–9.0	6.00–9.00	6.00–9.00
Industrial Bond Yields:					
United States	7.90	9.10	8.75	8.64	8.00
United Kingdom	10.79	16.83	15.98	14.62	13.48
France	8.87	11.93	10.93	10.86	11.12
Germany	9.42	10.89	8.52	8.05	6.88
Italy	8.56	13.57	16.18	15.82	11.71
Japan	7.57	11.61	9.10	8.78	8.19

* Long-term only. Rates for other countries include both medium- and long-term rates.
** Rates conform to the minimum of the Consensus on export credit terms.

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EXPORT-IMPORT BANK ACTIVITIES DURING 1977

Most U.S. exports do not require direct United States Government support. For those transactions which involve large sums of money, relatively long repayment terms, or perceived high political risk, however, the Export-Import Bank of the United States serves as a catalyst for financing our exports by assuming those risks commercial banks are unable or unwilling to take for their own account. Since the Bank is the only resort available to U.S. exporters facing credit competition offered at subsidized rates and terms it will consider enhancing its normal support to meet such competition.

During the Transitional Quarter (July–Sept. 1976) and the first 9 months of U.S. fiscal year 1977 (October 1976–June 1977), the Export-Import Bank authorized $5.7 billion in loans, guarantees and insurance—significantly less (34 percent) than total authorizations of $8.6 billion during fiscal year 1976. Of total authorizations, 22 percent was in commitments to disburse Eximbank funds (see Table 11). Loans authorized during this period carried an average interest rate of 8.63 percent, compared with an average cost of funds of 7.3 percent.

Average interest expense on Eximbank's total outstanding borrowings during the year was 7.14 percent, while average interest income (excluding commitment and guarantee fees) was 6.33 percent. Thus, the average interest spread improved from minus 0.9 percent in fiscal 1976 to minus 0.8 percent during the 12 months ending June 30, 1977. Over this period, Eximbank earned a net profit of $130.9 million on gross revenues of $765 million. During the 12-month period, Eximbank borrowed $1,080 million from the Federal Financing Bank on terms of 9¼ to 11¾ years at an average interest rate of 7.3 percent.

COMMODITY DEVELOPMENTS

Production Prices and Trade

Agricultural Commodities: Changing supply and demand conditions were the primary causes of price volatility in world commodity markets for soybeans, cotton, coffee and cocoa during 1976/77. Prices of these commodities rose sharply in the spring of 1977 but price pressures subsided for most during ensuing weeks as demand slackened somewhat and prospects for larger crops next season began to materialize. Declining prices for soybeans and cotton during the second half of the year were attributed mainly to the improved production outlook, while the drop in coffee prices was due to the build-up of inventories in importing countries (consumer price resistance) and the expectation of partial recovery in the Brazilian harvest. Uncertainty about cocoa, caused principally by reports of drought in West Africa, held cocoa prices firm throughout the year.

In grains, a sharp increase in stocks (especially of wheat) and anticipations of large, near-record harvests in 1977 combined to weaken prices generally during the year. Corn prices, after some resistance to rising supplies early in the year, ultimately joined the price downtrend as well. Wheat and corn prices in the United States both finished the period under review close to support levels, signalling perhaps the end of the considerable price volatility in grain markets that had begun with the 1972 crop shortfall and the subsequent major expansion of export markets for U.S.-produced grain.

The tightness of the world *grain* situation which had prevailed over the past few years was eased considerably by the record 1976/77 world grain harvest. Led by a substantial increase in the wheat crop, world grain production, excluding rice, totaled 1,103 million metric

TABLE 11.—*Summary of Eximbank Authorizations*
[Millions of dollars]

	FY 73	FY 74	FY 75	FY 76	Transitional Qtr. & thru June 1977
Loans	$4,053	$4,905	$3,812	$3,468	$1,275
Guarantees	1,988	1,594	1,574	1,622	985
Insurance	2,473	2,601	2,929	3,527	3,449
Total	$8,514	$9,100	$8,315	$8,617	$5,709

tons—12 percent above the 1975/76 level. The Soviet Union accounted for two-thirds of the increase in production, but the U.S., Canadian and Indian crops were also larger. Despite this substantial recovery, however, world per capita grain supplies were still only marginally above 1973/74 levels.

Increased grain supplies led to lower prices which encouraged the first expansion of world grain use since 1973/74. At 1,047 million metric tons, consumption was 6 percent higher than in 1975/76. Despite the rebound, grain consumption continued below trend levels because of the lag in the use of grain for livestock feed in developed countries. Food use of grain continued to be either at, or above, trend in both the developed and developing countries.

The volume of grain moving in world trade was about the same as in 1975/76. Lower import requirements in the Soviet Union were roughly matched by increased grain imports by Eastern and Western Europe and Japan. Absent an expansion in trade, world stocks of wheat and course grains on July 1, 1977, were 168 million tons—56 million tons higher than a year earlier and the highest stock level in eight years.

The combination of increased supplies, stagnant export demand and larger stocks tended to weaken grain prices throughout 1975/76. Prices of wheat and corn declined by about 25 percent on world markets. Wheat declined gradually because of sharply rising stocks while corn prices dropped sharply in mid-year due to an easing of the tight livestock feed situation. The resumption of Brazilian soybean exports and prospects for favorable feedgrain and soybean crops in the United States were the primary factors nudging prices lower.

Soviet purchases of grain from the United States during the first year of the US/USSR Grain Agreement barely exceeded the minimum levels of 6 million tons of wheat and corn. Shipments by October 1, 1977 were expected to include 3,137 thousand metric tons of corn and 2,990 thousand metric tons of wheat. A dry summer and excessive rains late in the season combined to reduce the 1977/78 Soviet grain harvest from previous expectations. The disappointing crop, though still the fourth largest on record, increased Soviet grain import requirements. This prompted the United States to raise non-consultative permissable grain purchases under the Grain Agreement from 8 million tons to 15 million tons.

The world *coffee* situation during 1976/77 continued to be dominated by the effects of the 1975 frost in Brazil. The world coffee crop of 62 million bags was 16 percent below the previous year's level, with the Brazilian crop at about two-fifths of its normal level. Though some recovery is anticipated in 1977/78, normal Brazilian production levels are not expected to be attained for another 2 years. As a consequence of supply shortfalls, coffee prices soared to record levels in the spring of 1977. The International Coffee Organization's Composite Price Indicator peaked at $3.27 a pound in mid-April with prices driven up partly by precautionary inventory building by consumers. Coffee prices have since softened as the improved crop outlook for 1977/78 affected consumers' attitudes towards stocking and as consumers continued to resist the higher prices.

Cocoa prices (Accra, N.Y. spot) peaked at $2.06 per pound in the spring of 1977 and then trailed to somewhat lower levels. Prices continued to show strength until late in the year, however, because of the tight supply situation and uncertainties with respect to future production in West Africa. World cocoa production declined 7 percent in 1976/77—because of unfavorable growing conditions in Nigeria and Ghana, the harvest reached only 1.4 million metric tons, well below the average of recent years. Year-end stocks were reduced to the equivalent of 3 months' consumption and prices rose to record levels in the spring of 1977. Much of the 1977/78 supply/price picture hinges on the out-turn of the African crop which accounts for three-fifths of world production.

Despite a poor crop in the Soviet Union, world *sugar* production reached a record level of 87 million tons in this harvest year. As a result, prices dropped to the lowest levels of recent years despite higher Soviet and Peoples' Republic of China import demand. Both cane and beet crops continued to rise while consumption lagged, partly in response to the high prices of 1974/75. As a consequence, production exceeded consumption by nearly 4 million tons and world stocks have risen to nearly 21 million tons—or about equal to 25 percent of expected world consumption—representing a return to normal historic levels for the first time since 1970.

The world *cotton* situation in 1976/77 was highlighted by tight supplies and the drawdown of stocks to their lowest levels since 1953. World production in 1976/77, at 58 million bales, was up 6 percent from the (weather-damaged) crop of the previous year although still nearly 4 million bales below consumption levels. As a result, stocks in August 1977 amounted to 19 million bales (equal to about 4 months use). Stocks on the same date in 1976 had amounted to 23 million bales. These short supply conditions drove prices to record levels in the spring of 1977 with U.S. cotton prices (SM 1-1/6 inch, cif. Northern Europe) climbing to 88 cents a pound. U.S. cotton was, nonetheless, competitively priced relative to foreign cotton and the United States became the primary source for world market supply, accounting for more than a quarter of the 18 million bales of cotton moving in world trade.

The higher prices encouraged an expansion in cotton acreage worldwide in 1977/78 by perhaps as much as 6 percent, with the bulk of the increase concentrated in the United States. From March 1977 to the end of the year cotton prices fell by about 25 cents from peak levels, because of the anticipated larger crop and a delayed turnaround in mill demand. However, some increase in mill consumption in 1977/78 will keep stocks relatively tight and prices could firm. The United States is expected to remain the world's largest cotton exporter next year.

U.S. imports of *vegetable oils* in 1976/77 declined about 20 percent below the record levels recorded in 1975/76, while exports of vegetable oils rose nearly 35 percent above the depressed levels of the preceding year. The shift to a more favorable U.S. balance of trade in vegetable oils largely reflected the narrowing to a more historical relationship of price differentials between soybean oil and palm oil in 1976. Disappointing oilseed crops in many producing countries (including an 18 percent lower U.S. soybean crop), lowered availabilities and precipitated a sharp increase in the prices of oils and oilseed meal in early 1976/77. In addition, the Brazilian Government instituted soybean export restraints, including a brief embargo, thus adding to the short supplies in world markets and increasing price pressures. In late spring 1977, the resumption of more normal levels of Brazilian exports and indications of a substantial increase in U.S. soybean acreage combined to ease the situation.

Industrial Commodities: The worldwide economic recovery which began in late 1975 has been less vigorous than anticipated and, as a consequence, the industrial commodities situation has been mixed. Although the London *Economist* price index for industrial raw materials registered an increase of more than 10 percent in early 1976/77, when it became apparent that the increased tempo of economic activity was not such as to lead to substantial reductions in the large stocks of some industrial materials—notably copper and zinc—prices retreated.

So far in the recovery phase most industrial raw material producers have been meeting rising demand at production levels well below full capacity. Consequently, shortages of most industrial raw materials are not anticipated in the foreseeable future, on the basis of current forecasts. A likely exception is the aluminum industry, which has not expanded capacity significantly since the early 1970's and in which drought-related power shortages in the Pacific northwest have effectively reduced productive capacity.

Copper market prices during 1977 reflect the fundamental weakness of demand for the metal and the continued buildup of stocks—which are already at record levels worldwide. Cash prices for copper wirebar on the London Metal Exchange (LME), which began the year at 62 cents a pound, reached a high of 70 cents in late March and had declined to 56 cents by early July. U.S. producer prices followed a similar pattern, beginning the year at 65 cents, rising to 74 cents in late March and falling back to 65 cents by late July. The strike against U.S. producers at the end of the first half of the year thus failed to sustain prices.

Most major producers (the United States, Chile and Peru) increased copper mine production during 1976 as prices rose from the depressed levels of 1975. Production in Zaire decreased 10 percent, however, mainly because of technical problems. World consumption of refined copper metal increased to 6,441 thousand metric tons in calendar 1976, up from

5,461 thousand metric tons in 1975 but well below the 1973 record of 6,942 thousand metric tons. Consumption rose in Western Europe, Japan and the United States, Canada and Australia and in some developing countries such as Brazil, Chile, Mexico, South Korea and Taiwan. Consumption in Africa declined, however. Since production outpaced consumption, world stocks of refined copper metal increased by about 9 percent in 1976. Stocks, at 1,672 thousand metric tons by year's end—an increase from 1,563 thousand metric tons at the beginning of the year—were a major factor in depressing market prices.

Aluminum production has been flat for nearly a year and the industry holds large stocks. Recent indications suggest a growth in world demand, however, that could approximate 12 percent in 1977. Should this growth materialize, capacity utilization in this industry could rise to about 90 percent by the end of 1977 (as against 86 percent in 1976 and 78 percent in 1975). This level of utilization is the highest the world industry has historically been able to maintain for any length of time.

The current aluminum ingot price was raised from 48 cents per pound to 51 cents in March and again to 53 cents in April 1977. By mid-1978, producers are expected to reach the 58 cents estimated to justify investment in new capacity.

Because of sharp production cutbacks during the recession in 1975 the *lead* industry entered the recovery phase with relatively low stocks. This limited stock situation and an unusually strong demand for automobile batteries led to a lead price rise of almost 100 percent between early 1976 and early 1977. The supply situation for lead was expected to remain tight through 1977 and into 1978, but no major shortage is forecast. The low stock situation, however, is expected to keep lead prices firm. At mid-1977, lead prices, at roughly 24 cents, had receded from the 31 cents peak reached early in 1977, but were still above the 15 cents pre-boom levels of 1973.

As with other non-ferrous metals, *zinc* prices remained well below the 1974 high during 1975 but made a strong recovery during the first half of 1976. Zinc producers responded quickly to the economic recovery, however, and when the recovery slowed in the second half of 1976, producer stocks accumulated rapidly and zinc prices fell again. Although world stocks are being drawn down they are not expected to fall below 1976 levels until late 1977 or early 1978 and as a consequence production may remain well below capacity levels.

During calendar year 1976 world *tin* production was approximately 15,000 tons lower than consumption (estimated at 195,000 tons), the deficit being made up largely from sales from the International Tin Council's (ITC) buffer stock. For 1977 as a whole, the ITC projected an excess of consumption over production of some 20,000 tons, but such an excess cannot be met from the ITC buffer stock, which is depleted. Thus upward price pressures are expected to continue, keeping prices near or somewhat above the $4.50 per pound ceiling of the ITC's buffer stock price range. This would approximate the historic high reached in 1974. Tin production, while increasing in 1976 and 1977, is still below the recent peaks of 1972 and 1973. In recent years, production has declined mainly in Malaysia, the world's largest producer.

International Commodity Policy Developments

As noted earlier in this *Annual Report* of the NAC, the United States modified its previous stance on international commodity problems during 1977 by constructively seeking to negotiate both international commodity agreements and a common fund to help finance agreements which operate through international buffer stocks. This approach is supported by existing facilities designed to help stabilize the export earnings of producer countries—in particular the Compensatory Financing Facility of the International Monetary Fund. In addition, the United States is promoting new efforts to expand the production of industrial raw materials in the developing world through the multilateral development banks and through the several national investment insurance agencies.

The United States believes that the benefits of this program will accrue to all countries, developing and developed. It should encourage more stable economic growth and expand employment opportunities worldwide and should lead to more stable external payments positions for the poor and wealthy countries alike.

International commodity issues were discussed at the Conference on International Economic Cooperation (CIEC), concluded in Paris in June 1977, and commodities were the topic of one of the four separate commissions created under the CIEC—the Commission on Raw Materials (CORM). The demands of the developing countries centered on such questions as: (a) indexing commodity prices to the prices of manufactured exports of developed countries; (b) export earnings stabilization on a concessional basis by the International Monetary Fund; and (c) the institution of additional measures to stabilize the export earnings of developing countries. All of these issues involved fundamental divergences of views between the developed and developing countries and, as a result, no substantive progress could be made on the issues, except for the significant agreement that a Common Fund should be established as a new entity, the specific purposes and objectives of which would be worked out in UNCTAD.

Common Fund: A common fund, initially proposed by the UNCTAD Secretariat in late 1974, is considered to be the centerpiece of the Integrated Program for Commodities by the developing countries. The proposal espoused by the developing countries would be endowed with resources of $6 billion to finance buffer stock arrangements for at least ten commodities. It would, in addition, finance other measures, such as market promotion and diversification activities, as well as intervene in markets to buy commodities not covered by agreements in the event of abnormally low prices.

At the CIEC in June 1977 the United States agreed with other developed and developing countries to the "establishment of a Common Fund with purposes, objectives and other constituent elements to be further negotiated in UNCTAD." The United States and several other developed countries, however, have opposed the UNCTAD version of the common fund because it could encourage the creation of uneconomic commodity agreements, disrupt commodity markets, and lead to financing of non-buffer stock measures that are more effectively considered in existing international financial institutions. The U.S. would not favor a common fund that would become involved in the financing of non-buffer stock measures or intervene directly in commodity markets.

Commodity Agreements: The Fifth *International Tin Agreement* (ITA) came into force on July 1, 1976 and for the first time in the twenty-year history of the ITA the United States was a participant. The ITA operates a buffer stock to moderate tin prices for the benefit of producers and consumers and also provides a forum for discussion on issues of interest to tin producers and consumers. During the June 1977 Ministerial Session of the CIEC the United States announced that it would seek Congressional authorization for a contribution to the ITA buffer stock. It is the position of the new Administration that a larger buffer stock will enhance ITA ability to stabilize prices and promote the interests of producers and consumers. United States participation in the ITA resulted in a more rigorous review of price range revisions and has substantially increased the influence of consumers in decisions made by the International Tin Council, the operating arm of the ITA.

The *International Coffee Agreement,* to which the United States is a signatory, went into effect in October 1976. As anticipated, the Agreement's export quota provisions did not come into effect because of the prevailing extremely high coffee prices on world markets (see above). Nevertheless, meetings of the International Coffee Council (ICC) were used as a means of exchanging views at a time when consumer-producer relations were strained by unstable, high prices and an uncertain supply picture. The United States made an important contribution in this regard to an ICO working group short-term study of the world supply and demand situation.

The *International Cocoa Agreement* (ICCA) which the United States did not sign because of dissatisfaction with its provisions for export quotas and prices, entered into force on September 30, 1976. The Ivory Coast decided to sign the ICCA with the proviso that the price range be re-negotiated upward by September 30, 1977. Negotiations resulted in an increase in the ICCA's price range, which, however, was still well below market prices. During 1977 cocoa prices rose to record levels and buffer stock funds continued to accrue the export tax levied for that purpose, but, even though the Agreement's price range was increased, there were no purchases because of the high market prices.

Negotiations for a new *International Sugar Agreement* (ISA) were held in Geneva from April 18 to May 27, 1977. These talks concluded unsuccessfully with importers and exporters unable to agree on the relative role to be played by export quotas and stocks in the new Agreement. The United States called for stock levels sufficiently high to defend the ceiling price, but exporters were not willing to agree to hold stocks at levels which the United States considered to be necessary.

At the end of the Conference it was decided that the Executive Director of the International Sugar Organization should hold consultations in July with major exporters and importers to see if there was any basis for reconvening the negotiations in September. Considerable progress was made at the July consultations with the United States presenting a stock financing scheme which gained wide acceptance. The Conference was reconvened on September 12 and negotiations for a new ISA were successfully concluded. The Agreement is scheduled to enter into force on January 1, 1978. The new ISA, through the combined use of stock and quota mechanisms, is designed to stabilize prices with a ten cent per pound price band (11–21 cents).

UNCTAD: In keeping with the spirit of the resolution on commodities adopted by the Fourth Session of the U.N. Conference on Trade and Development (UNCTAD) in May 1976, the United States participated in a number of preparatory meetings during 1976 and 1977. U.S. representatives attended conferences on hard fibers, rubber, jute and jute products, copper, tropical timber, cotton, manganese, and vegetable oils. The purpose of these preparatory meetings is to identify problems peculiar to the commodity in question, to consider these problems within the context of the broad range of possible international measures that might be taken and to determine the need and feasibility of action in each particular case. According to the UNCTAD format, the preparatory meeting precedes the convening of a conference to negotiate an international agreement or other arrangements to improve international trade in the commodity.

While developing countries (producers for the most part) are anxious to begin the negotiating process, developed consuming countries have insisted on a more analytical approach. Thus, several of the preparatory meetings have led to the formation of intergovernmental groups of experts to examine individual commodity problems in more detail. Expert groups were created for hard fibers, copper, tropical timber, cotton, and vegetable oils. In addition, working groups were established for natural rubber and jute and jute products to study these commodities further.

This more intensive review of individual commodity problems has delayed the UNCTAD timetable for convening negotiating conferences, but in the absence of sufficient commodity data and without a knowledge of the particular commodity market a negotiating session would not be fruitful. However, substantive progress has been made as regards *copper* and *natural rubber.*

Considerable attention has been focused on copper because of the volatility of copper prices and its importance to the export earnings of many developing countries. In May 1977 the second preparatory meeting on copper extended the existing expert group so it could study the economic feasibility of various price stabilization schemes and consider ways to improve the consultation and exchange of views among producer and consumer countries, including a producer/consumer consultative body. The experts group is to complete its work in late 1977 and submit its report at the third preparatory meeting in January 1978. This feasibility study is expected to serve as an aid in deciding whether to convene a negotiating conference for a commodity agreement for copper.

At the natural rubber preparatory meetings, producer countries proposed a price stabilization scheme modeled on the producer-only scheme of the Association of Natural Rubber Producing Countries. But this scheme was expanded somewhat to provide for mandatory consumer contributions and a 400,000 ton buffer stock, supplemented by supply measures. This producer proposal as well as other measures to stabilize the natural rubber industry are to be studied by producers and consumers in meetings scheduled for late 1977 and consumer countries are expected to be called upon to commit themselves to negotiate a price stabilization scheme at a meeting scheduled for February 1978.

Although tungsten is not part of the Integrated Program, producers and consumers of this metal met in July under UNCTAD auspices to consider measures for trade stabilization. Producers tabled a proposed price stabilization scheme similar to the tin agreement and consumers have tabled proposals *inter alia*, to centralize and improve current data collection efforts and establish a producer-consumer body similar to the lead-zinc study group. Producers and consumers are to meet again to discuss background studies on the tungsten industry and to assess the proposed measures to improve trade. A major obstacle to any international agreement is the lack of a central market.

FAO Commodity Groups: During the year, FAO Intergovernmental Groups met on jute, hard fibers, meat, rice, tea, bananas, and oilseeds. These meetings, conducted in a workman-like, unpolemical, fashion took on added importance because of the UNCTAD Preparatory meetings.

Most FAO commodity groups were established about 10 years ago to provide forums for the exchange of market and technical information about commodities with a view of improving the functioning of markets. The United States has viewed the FAO commodity meetings as opportunities for commodity experts to pool information on production and demand and to exchange views rather than as forums for the negotiation of international commodity arrangements. Over the past year, FAO groups have been engaged in assisting the UNCTAD Secretariat by lending staff support for analysis and consultation. Moreover, FAO meetings often preceeded the UNCTAD conferences and were useful technical precursors to the more policy-oriented UNCTAD meetings. The United States has endorsed active FAO involvement in the preparation of the discussions mandated by UNCTAD IV as proper and useful in that it makes available some 10 years of commodity experience and knowledgeable expert staff.

International Wheat Council: Preparations for negotiation of a new International Wheat Agreement had been progressing slowly at the technical level until the new Administration indicated a shift in U.S. policy toward grain reserves. At the June 1977 meeting of the International Wheat Council the United States introduced its current grain reserve proposal which, *inter alia*, calls for reserve stock mechanisms with price indicators. It also provides for the sharing of costs between exporters and importers with a special provision for the poorer countries and seeks to avoid interruptions in trade due to conditions of surplus or scarcity. Scheduled preparatory conferences may lead to a draft agreement, which would be taken up at negotiations tentatively scheduled for early 1978.

World Food Council: The World Food Council was established by the 1974 World Food Conference, the highest international political body dealing exclusively with food issues. The June 1977 Third Session of the Council in Manila was significantly more successful than previous meetings and successfully laid the groundwork for a political commitment to a worldwide effort to attack the problems of hunger and malnutrition. That it did so may be ascribed in some measure to vigorous U.S. efforts to focus the Council's deliberations and to the substantial reconciliation of views between North and South on agricultural and food issues which had taken place over the previous 12 months.

A major U.S. objective was to have the Council provide impetus to a concerted effort to address the problems of hunger and malnutrition. The United States urged that nutrition be the dominant theme of the Council meeting and that other food issues—trade, distribution, production, aid, inputs—be considered in light of their impacts on the underlying problem of providing adequate nutrition to the world's poor.

The United States sought to dispel any notion that because of recent good harvests the food crisis was over. The U.S. delegation outlined the principles of the U.S. approach to an international agreement with international grains reserves designed to reduce price fluctuations as a means of enhancing world food security. The United States also emphasized its commitment to cooperation in helping to solve world food problems through food aid and increased aid to developing country agriculture and rural development.

The Council affirmed the goal of eradicating hunger and malnutrition, called on developing countries to initiate their own programs to do so and urged other countries to help with food, financial and technical assistance.

Commodity Investment Policy

The commodity boom of 1973–1974 and the oil embargo served to focus attention on many aspects of the world's raw material industries and since early 1975 extensive work has been done on supply and demand issues in the raw materials sector. This work concluded that there is some reluctance on the part of private companies to invest in raw material projects in the developing countries. Evidence supporting this conclusion includes:

(a) A World Bank report indicating that as much as 80 percent of exploration expenditures during 1970 to 1973 was in developed countries (the United States, Canada and Australia, in particular).

(b) A report by major European mining companies which stated that: "largely due to a lack of financial protection, funds spent for exploration in the developing countries have fallen from 57 percent of total exploration expenditures in 1961 to 15 percent in 1975."

(c) Semi-annual articles in the *Survey of Current Business* indicating a decline of investment by the foreign affiliates to U.S. companies in the developing countries (although part of this is due to decreased investment in manufacturing).

(d) Increased use of project financing in recent raw material development projects as opposed to general acceptance of liability of new investment by the parent company is now a generally accepted method for new investment. This trend is ascribable to a perception of higher risk by the multi-national enterprises (MNEs) for projects in developing countries than for projects in developed countries where the risks of expropriation are perceived to be lower.

(e) Large MNEs are reported to be reluctant to invest in mineral projects in developing countries since senior industry officials indicate a preference for developing, for example, a copper deposit in a developed country with ore of less than half the richness available in a developing country than investing in the developing country. This is largely because of political risks, coupled with MNE desires to retain full control of operation of a project.

(f) A November 1976 publication of the British-North American Committee reported that: "The shift of interest away from the Third World began almost as soon as the challenge to established methods of financing development became apparent. During the 1960's, each major nationalization in the developing world brought a reevaluation of the relative attractiveness of other sources of minerals. For example, the nationalization of copper industries in Zaire, Chile and Zambia 5 to 15 years ago encouraged the development of deposits containing lower grades of copper in North America. The relative attractiveness of higher-grade ores in outlying parts of the world has altered in favor of the higher political attractiveness—and overall profitability—of lower-grade deposits elsewhere which rated better with investors."

While these statements do not prove there has been a misallocation of resources toward developed country raw material deposits and away from developing country deposits, it appears that there is a strong probability such is the case from a global point of view.

The trend away from investment in developing country raw material projects could have serious consequences regarding the efficient allocation of investment funds as well as the growth potential for many developing countries with commercially exploitable mineral deposits. It was with this latter concern, together with a concern regarding supply access, that the United States proposed the creation of an International Resources Bank (IRB) which would, in effect, have provided multilateral investment insurance to private investors for raw materials projects in developing countries. Pursuant to decisions made at the 1976 annual meeting of the IBRD and IMF, the Bank/Fund Development Committee reviewed the merits of the proposal and concluded that other measures to stimulate investment in developing country raw material projects should be stressed first.

The Development Committee's report did, however, conclude that non-commercial (i.e., political risk) factors have affected investment in some mineral resource projects and these factors have influenced the choice between investing in raw materials projects in developed and developing economies and among different developing countries. The Committee's conclusion, in effect, confirmed the U.S. view that investment in developing country raw material projects had been reduced due to political risk factors in many countries.

The Development Committee's findings have prompted more attention to mineral investment and World Bank lending for mineral projects is expected to increase. United States concerns regarding investment in raw material projects in developing countries have also prompted the new Administration to seek authority for the Overseas Private Investment Corporation (OPIC) to resume offering investment insurance for U.S. investors in overseas raw material projects. (See Chapter VI of this Report for further details.) The U.S. has also lent its support to a substantial increase in resources of the International Finance Corporation (IFC) in order to facilitate IFC financing for, and participation in, developing country raw material projects.

COMMODITY CREDIT CORPORATION (CCC) EXPORT CREDIT SALES PROGRAM

Agricultural exports financed under the CCC Credit Program for U.S. fiscal year 1977 totaled $755.3 million, as compared with $956.9 million for the 15-month period ending September 30, 1976 (the previous fiscal year plus the Transitional Quarter). The major users of CCC credit in fiscal 1977 were Poland ($173.9 million), Korea ($128.4 million), Portugal ($112.2 million), Peru ($74.1 million), Greece ($65.8 million), the Philippines ($65.5 million) and Pakistan ($43.6 million). Of the $755.3 million total, approximately $112.2 million represented financing on 12-month repayment terms, $.5 million was on 24-month terms with equal annual repayments, and $642.6 million was provided on 36-month terms with equal annual repayments of principal plus accrued interest. In fiscal year 1977, CCC credit lines established with 13 countries were reviewed by the National Advisory Council (as against lines with 21 countries during the preceding 15 months).

CCC credit financing was maintained at a high level during fiscal 1977 in light of large exportable supplies of United States agricultural products. As of September 30, 1977 the list of commodities eligible for CCC credit financing included: almonds, barley, breeding cattle, breeding swine, corn, cotton, cottonseed oil, dry edible beans, dry edible peas, dried whey products, eggs (dried, frozen and canned), hog grease, nonfat dry milk, oats, peanut oil, poultry (canned and frozen), milled and brown rice, sorghum, sunflowerseed oil, tallow, tobacco, wheat, wheat flour, soybean oil, and edible soyprotein.

CCC interest rates are also reviewed by the National Advisory Council. In order to encourage the use of credit lines with shorter maturities, CCC interest rates were lowered for the 6 to 12-month and over 12 to 24-month periods in October 1976. For half of the year the rates were as follows:

	U.S. Bank Obligation	Foreign Bank Obligation
	(Percent)	
6–12 months	6	7
Over 12–24 months	7	8
Over 24–36 months	8	9

During about the second half of the year the 6 to 12 month rates were set at 7 percent and 8 percent and the 24 month rates were 7 percent and 8 percent. The 36 month rates of 8 percent and 9 percent were maintained throughout the year. Since these rates were higher than the cost of money to CCC, the CCC Export Credit Sales Program was virtually self supporting during the period under review.

The CCC Export Credit Sales Program is a commercial (rather than a foreign assistance) program designed to help finance exports of eligible United States-produced agricultural commodities through the purchase of private exporters' accounts receivable. An irrevocable commercial letter of credit from an acceptable

American or foreign bank authorizing the CCC to draw drafts against the letters of credit when payment is due is required for all transactions. As a general rule, the foreign bank issues the letter of credit which must be fully advised by an American bank and confirmed for at least 10 percent for the commercial risks. If a United States bank, or one of its branches in a foreign country, issues the letter of credit it is liable for the political, as well as the commercial risks on the full amount of the value financed for export.

On those requests for CCC credit from either foreign importers or United States exporters when the amount to be financed is covered by a foreign bank letter of credit, and the financing period is longer than 12 months and the amount involved exceeds $4 million, the Department of Agriculture seeks the concurrence of the National Advisory Council. If the amount to be financed is covered by an American bank-issued letter of credit, NAC concurrence is not sought. Similarly, if a foreign bank obligation covers the amount to be financed and each transaction involves not more than $4 million and the financing period is no longer than 1 year, NAC concurrence is not sought.

ACTIVITIES UNDER THE PUBLIC LAW 480 PROGRAM

Commodity programing under *Title I* of Public Law 480 during the Transition Quarter (July 1–September 30, 1976) totaled $118.9 million for 640,000 metric tons of commodities. During that period, convertible local currency agreements comprised approximately 78 percent of the total value of agreements signed; dollar credit agreements comprised the remainder. In terms of dollar value, the four countries with the largest programed amounts were Indonesia, 37 percent ($43.6 million); Pakistan, 24 percent ($28.0 million); Egypt, 13 percent ($15.4 million); and Korea, 12 percent ($14.0 million).

Commodity programing under Title I of Public Law 480 during U.S. fiscal year 1977 totaled $796.1 million for about 5.0 million metric tons of commodities. In terms of dollar value, the five countries for which the largest amounts were programed were Egypt, 24.8 percent ($197.2 million); Indonesia, 18.1 percent ($143.9 million); Korea, 10.1 percent ($79.1 million); Portugal, 8.8 percent ($70.0 million); and Bangladesh, 8.0 percent ($63.8 million).

Public Law 480 programing during U.S. fiscal year 1977 concentrated primarily on wheat and rice. Wheat accounted for about half of the total value and 70.3 percent of the total quantity programed (3.5 million tons). Rice, at 709,000 tons, accounted for 23.7 percent of the total value and 14.3 percent of the total quantity programed. Among the nonfood commodities, programing of cotton declined from 90,000 bales in fiscal year 1976 to 50,000 bales in fiscal year 1977 while the quantity of tobacco programed in fiscal year 1977 increased from 5,400 tons to 13,500 tons.

Under the *Title II* (donations) program, commodity shipments during the transition quarter amounted to 234,262 metric tons (250,193 tons on a grain equivalent basis) valued at about $64.0 million. The major commodities shipped during the period were wheat, wheat products, and feedgrains. Wheat accounted for 73,714 tons while wheat products accounted for 95,326 tons on a grain equivalent basis. Feedgrains, which were programed only for human consumption, comprised 13,272 tons of corn and grain sorghum while products accounted for 44,447 tons on a grain equivalent basis.

Title II shipments of vegetable oil amounted to 10,455 tons (23.1 million pounds) of which the main component was soybean oil. Nonfat dry milk shipments totaled 5,322 tons (11.7 million pounds) during the transition quarter. Other commodities shipped included dry peas and soya flour.

During fiscal year 1977 commodity shipments totaled 1,335,237 tons (1,431,668 tons, grain equivalent) valued at about $362.0 million. The major commodities shipped were wheat, wheat products, and feedgrains of which wheat accounted for 476,263 tons, while products accounted for 480,833 tons, grain equivalent. Feedgrains comprised 50,111 tons of corn and grain sorghum, while products of feedgrains accounted for 286,346 tons, grain equivalent.

Shipments of vegetable oil, mainly soybean oil, were 38,878 tons (85,710,000 pounds). Some 57,448 tons of nonfat dry milk were shipped under Title II, along with soya flour and dry peas.

During the Transition Quarter and fiscal year 1977, public interest in food aid programing continued unabated. The U.S. Congress amended Public Law 480 through enactment of The Food and Agriculture Act of 1977 (P.L. 95–113) and The International Development and Food Assistance Act of 1977 (P.L. 95–88). The new provisions of law reflect enhanced concern for the poorest people in developing countries and direct food aid programing more firmly toward support for developmental activities in the recipient country. U.S. development assistance is to be coordinated with similar expanded efforts of international organizations, other donor nations, and recipient countries in an integrated approach toward more efficient use of all resources.

P.L. 95–113 extends the authority of Public Law 480 through the end of December 1981. Some of the major changes effected by P.L. 95–88 are:

a) Poverty criteria, as established by the International Development Association, are to be used as the basis for determining eligibility for concessional sales programing in the 75 percent category.

(b) Minimum tonnage requirements under the donations program increased for fiscal years 1978 through 1980. The minimum tonnage is 1.6 million metric tons, on a grain equivalent basis, of which a minimum of 1.3 million metric tons would be made available through nonprofit voluntary agencies and the World Food Program.

(c) A new Title III section is created which stresses the food for development concept and which encourages developing countries to increase their food availability.

VI. FOREIGN INVESTMENT POLICIES AND ISSUES

- **Net outflows of capital to finance U.S. direct investment overseas during the 12 months ending June 30, 1977 totaled $5.0 billion, about 16 percent more than in the preceding year but substantially less than the $9.8 billion recorded in fiscal year 1975. More than $3.9 billion of this capital outflow related to investments in Western Europe, with the United Kingdom alone accounting for nearly $1.4 billion. Net outflows to Latin America came to $0.4 billion while there was $0.6 billion U.S. disinvestment in Canada. Foreign direct investment in the United States led to net capital inflows of $2.0 billion during this same period.**

- **A review of policy toward international investment undertaken by the new Administration reaffirmed the traditional, liberal, U.S. attitude toward foreign investment. The fundamental policy of the United States Government in this area is neither to promote nor to discourage inward or outward investment flows and activities. The U.S. should, therefore, normally avoid measures which would provide special incentives (or disincentives) to investment flows and activities and should not normally intervene in the activities of individual companies as concerns international investment.**

- **The United States is participating in a series of negotiations relating to preparation of proposed codes of conduct dealing with the activities of multinational enterprises. This is consistent with general U.S. policy of encouraging multilateral action to maintain an international environment in which investment is relatively free to move and codes of conduct setting forth general guidelines for this purpose can serve useful purposes by providing bases for firmer expectations of accepted behavior on the part both of investors and host governments. Given the variety of legal. economic and social traditions which prevail among countries, however, general codes of conduct addressing wide ranges of issues are necessarily broad in character and tend not to be amenable to legally binding arrangements.**

- **During the period covered by this report of the NAC, the United States continued its efforts to deal with the problem of illicit payments in international commerce and in March 1977 the Secretary of the Treasury testified in support of proposed legislation to criminalize corrupt payments to foreign officials by U.S. nationals and offered certain suggestions for improvements in draft legislation being considered. The U.S. also continued to pursue its initiative in the United Nations for an international agreement on illicit payments.**

TRENDS IN FOREIGN INVESTMENT FLOWS

Net outflows of capital to finance U.S. direct investment overseas during the 12-month period ending June 30, 1977 totaled $5.0 billion. This was about 16 percent higher than in 1976 but substantially below the $9.8 billion figure recorded in fiscal year 1975. The bulk of this capital outflow—more than $3.9 billion—related to U.S. investments in Western Europe with the United Kingdom alone accounting for nearly $1.4 billion. Net outflows to Latin America totaled $0.4 billion while there was $0.6 billion disinvestment in Canada.

Foreign direct investment in the United States led to net capital inflows of $2.0 billion during this period, or about the same level as was reached in the preceding year. Western Europe accounted for $1.6 billion of this inflow while Canada and Japan were responsible for about $0.2 billion and $0.1 billion, respectively. The amounts for European and Japanese investments would have been larger had there not been a $132 million disinvestment by United Kingdom investors during the January–March 1977 quarter, and a $129 million disinvestment by Japanese investors in the April–June 1977 quarter.

Residents of the United States continued to increase their holdings of foreign securities during the period July 1, 1976 to June 30, 1977, adding about $7.4 billion of net purchases, or 3 percent more than the particularly large such net purchases of $7.1 billion in U.S. fiscal year 1976. The geographic distribution of these foreign securities purchases changed somewhat as compared to the preceding reporting period, however, largely because of a decline in new issues of Canadian bonds in the U.S. capital market and an increase in new bond issues by international financial institutions and by European and Japanese issuers. This increased use of U.S. capital markets by international financial institutions and by Europe and Japan occurred at a time when American interest rates were, as a general rule, lower than those prevailing in capital markets abroad.

Foreign residents (other than foreign official reserve agencies) substantially increased their holdings of U.S. securities in this period, with net purchases of $4.4 billion, or 22 percent more than the substantial $3.6 billion of net purchases recorded during U.S. fiscal year 1976. About three-fifths of these U.S. securities purchased by foreigners during the 12 months ending June 30, 1977 took the form of marketable Treasury bonds and notes, whereas in the previous fiscal year less than one-fifth of net foreign purchases had been Treasury bonds and notes while more than four-fifths had been other types of U.S. securities—especially corporate shares. A major portion of the large net purchases of Treasury bonds and notes during the reporting period was conducted for the account of the international financial institutions.

Foreign official purchases of marketable Treasury bonds and notes—which nearly tripled between U.S. fiscal years 1975 and 1976 to about $3.1 billion—expanded further in this reporting period, to over $8.5 billion. However, the foreign official reserve agencies reduced, at the same time, their net purchases of other types of U.S. securities, adding only about $2.8 billion to their holdings compared with an increase of almost $3.4 billion during U.S. fiscal year 1976. This decline in net purchases of U.S. corporate and other types of securities took place during a period of a general softening of securities prices in United States capital markets. Taking into account purchases of Treasury securities and other U.S. securities, foreign official reserve agencies purchased $11.3 billion of U.S. long-term securities during the period covered by this *Annual Report* of the NAC, or considerably (75 percent) more than the amounts so purchased in U.S. fiscal year 1976.

Selected data on long-term capital flows to and from the United States during the 12-month periods ending June 30 for the past 3 years are presented in Table 12.

UNITED STATES INTERNATIONAL INVESTMENT POLICIES AND OBJECTIVES

A fundamental review of United States policy toward international investment was undertaken by the new Administration shortly after it assumed office. This review re-affirmed the traditional, liberal, U.S. attitude toward foreign investment. The basic elements of this policy are set forth in the following paragraphs.

TABLE 12.—*Selected Long-Term Capital Flows**
[Millions of dollars]

	Fiscal Years		
	1975	1976	1977**
Net Long-term Private Capital Flows	—11,391	—9,132	—7,074
1. U.S. Direct Investment Abroad	— 9,844	—4,348	—5,033
2. Foreign Direct Investment in the U.S.	+ 2,589	+2,008	1,987
3. Foreign Securities	— 3,891	—7,141	—7,352
4. U.S. Securities other than Treasury Issues	31	2,936	1,788
5. Other, Reported by U.S. Banks	— 912	—2,203	—1,792
6. Other, Reported by U.Ş. Non-Banking Concerns	489	—1,059	697
7. Purchases of Marketable Treasury Bonds and Notes by Foreigners other than Foreign Official Reserve Agencies	147	675	2,631
Foreign Official Purchases of Marketable Treasury Bonds and Notes	1,126	3,086	8,548
Foreign Official Purchases of Other U.S. Securities	2,561	3,371	2,776

* A positive number represents a capital inflow and a negative number a capital outflow.

** For purposes of this table, the data for fiscal year 1977 encompass the transition quarter (July–September 1976) and the first three quarters of fiscal year 1977.

Source: Department of Commerce.

The fundamental policy of the United States Government toward international investment is neither to promote nor to discourage inward or outward investment flows and activities. This policy is consistent with, and re-affirms, the long-standing U.S. commitment to a generally open international economic system.

The United States Government should, therefore, normally avoid measures which would provide special incentives (or disincentives) to investment flows and activities and should not normally intervene in the activities of individual companies as concerns international investment. Whenever such measures are under consideration, the burden of proof should be on those advocating governmental intervention to demonstrate that it would be beneficial to the national interests of the United States.

Investment flows to the developing countries are a matter of particular concern to the United States. It is not the intent of United States policy to preclude appropriate assistance to those developing countries desirous of attracting foreign direct investment. Private capital transfers are an important supplement to other forms of resource transfers.

The United States respects the right of every country to determine the environment in which foreign investment takes place in that country. Once foreign investments have been effected in this framework, however, governments should not discriminate against established firms on the basis of nationality or deprive such firms of their rights—such as adequate compensation for expropriated property—under international law.

U.S. investment policy is based on four premises:

(a) International investment will generally result in the most efficient allocation of economic resources if it is allowed to flow according to market forces;

(b) There is no basis for concluding that a general policy of active promotion or discouragement of international investment would further the national interests of the United States;

(c) Unilateral U.S. Government intervention in the international investment process could prompt counter-actions by other governments with adverse effects on the United States economy and foreign policy; and

(d) The United States has an important interest in seeking to assure that established investors receive equitable and non-discriminatory treatment from host governments.

Accordingly, the United States Government should seek to:

(a) Strengthen multilateral discipline and restraint over governmental actions affecting investment decisions when such actions might adversely affect other countries;

(b) Obtain equitable treatment for investors consistent with such principles as national treatment of established firms and compliance with international law; and

(c) Foster international cooperation in dealing with problems arising from international investment.

CODES OF CONDUCT FOR INTERNATIONAL INVESTMENT

The United States has agreed to participate in several negotiations regarding the preparation of codes of conduct dealing with the activities of multinational enterprises (MNEs). This is in accordance with general U.S. policy of encouraging multilateral action to maintain an international environment in which investment is relatively free to move. Codes of conduct setting forth general guidelines in this area can serve useful purposes by providing the bases for firmer expectations of accepted behavior on the part both of investors and host governments. At the same time, given the varied legal, economic and social traditions which prevail among countries, as well as the differing perceptions of the role of foreign investment and multinational enterprises, general codes of conduct addressing a wide range of issues must necessarily be broad in nature and are not amenable to legally binding arrangements.

The position of the United States is that broad codes of conduct dealing with foreign investment should:

(a) Be voluntary in nature—that is, they should not constitute legally binding commitments among States or establish legally recognized or legally enforceable rights and duties on States or enterprises;

(b) Be appropriately balanced in terms of the responsibilities of governments as well as of the investors (MNEs);

(c) Not be utilized as a basis for discriminating against MNEs as opposed to domestic firms, and should provide nondiscriminatory treatment for established MNEs except under specifically defined and limited circumstances;

(d) Not derogate from those principles governing the treatment of foreigners and their property rights which the United States Government considers to be set forth in, and consistent with, international law; and

(e) Apply to all enterprises whether their ownership is private, public, or mixed private and public.

The position of the United States on general codes of conduct does not exclude the possibility of pursuing arrangements other than voluntary when a broad international consensus exists on a specific issue or group of issues and the subject matter is amenable to such arrangements. For example, the United States is attempting to negotiate a binding treaty on illicit payments (see below). There are also other areas being examined to determine whether binding international arrangements, outside the context of general codes of conduct on foreign investment, are desirable or feasible.

OECD Declaration

As noted in the Council's *Annual Report* for fiscal year 1976, the United States and 22 other members of the Organization for Economic Cooperation and Development (OECD) adopted a Declaration on International Investment and Multinational Enterprises on June 21, 1976.

The participating countries have been implementing various elements of this Declaration —Guidelines for MNEs and agreements concerning national treatment of foreign investors and official incentives/disincentives for foreign investment and the Decisions to hold consultations on these subjects—during the past year. Preliminary exchanges of views on experience under the Guidelines have taken place and discussions on national treatment (and exceptions thereto such as laws and regulations under which established foreign investors are treated less favorably than their domestic counterparts) are to be initiated. Consultations on the incentives/disincentives agreement have not yet been held. A formal review of the three basic elements of the OECD Declaration is scheduled to take place during calendar year 1979.

UN Commission on Transnational Corporations

The United Nations Commission on Transnational Corporations began its work on a comprehensive code of conduct during the period covered by this report of the Council. (See page 69 of the Council's *Annual Report* for fiscal year 1976 for background.) A Working Group of this Commission met in January and April 1977, but is not likely to meet its objective of preparing an annotated outline of a code of conduct for transnational corporations for submission to the full Commission during 1978. Significant differences persist between representatives of the developed and developing countries participating in these negotiations, particularly with respect to the general question of including in the proposed code provisions relating to the responsibilities of governments and on other issues concerning permanent sovereignty as against responsibilities under international law. The United Nations Center on Transnational Corporations has, in the meantime, continued its work on developing an information system on MNE activities and the environment in which these corporations operate, a broad research program on this subject, and creating a capability designed to assist host countries in their relationship with multinational enterprises.

UNCTAD

A code of conduct on the international transfer of technology is in the process of being negotiated within the framework of the United Nations Conference on Trade and Development (UNCTAD). The United States and several other developed countries submitted draft guidelines to the UNCTAD embodying general principles and the responsibilities of governments and enterprises in the transfer of technology in November 1975. The developing countries also submitted a draft code outlining detailed, and binding, terms and conditions for the international sale and exchange of technology.

Major areas of disagreement in these proposals relate to the legal character of the code, the extent of government involvement in private transactions, "guarantees" by technology suppliers, restrictive business practices and the nature and elaborateness of proposed new international machinery to oversee technology transfer arrangements. An Inter-Governmental Group of Experts met three times during 1977 on these matters and will continue its work in 1978 on a compromise draft to be submitted to a United Nations Negotiating Conference, tentatively scheduled to take place in the fall of 1978. At that time, it is planned that the decisions on adoption of the code will be made. Progress on most aspects of the code has, however, been slow and this may lead to further postponement of the U.N. negotiating conference.

The UNCTAD organized a Group of Experts in May 1972 to examine various aspects of restrictive business practices (RBPs) and to take into account the need for appropriate remedial measures at national, regional, interregional and international levels. During the last two years this Group has been specifically mandated to: (a) identify restrictive business practices; (b) examine ways and means of improving the exchange of information between the governments of developed and developing countries; (c) review the elements of a model law for developing countries on RBPs; and (d) ascertain the possibility of formulating multilaterally acceptable principles on RBPs.

The work of this UNCTAD Group of Experts has progressed slowly, and particularly with respect to the question of possibly formulating internationally acceptable principles on RBPs. The developing countries want a set of legally binding principles on this subject while the position of the United States and some of the other developed countries is that the time is not yet ripe for a binding international anti-trust code—that is, any set of principles on RBPs should be voluntary, both for corporations and governments. A report of the Group of Experts is scheduled to be presented to the UNCTAD during 1978.

International Labor Organization

A tripartite group within the International Labor Organization (ILO), composed of business, labor, and government representatives from four developed and developing countries, adopted a "Draft Declaration of Principles Concerning Multinational Enterprises and Social Policy" in April 1977. The Governing Body of the ILO (a specialized agency associated with the United Nations) plans to act on this Draft in late 1977. The 58 principles of this Draft Declaration cover general policies, employment, training, conditions of work and life, and industrial relations. The principles are voluntary and are addressed both to MNEs and to home and host governments. The Draft Declaration draws heavily on the OECD Investment Declaration and the associated guidelines. If approved by the ILO, it will eventually be forwarded to the United Nations for possible incorporation into its proposed comprehensive code of conduct. Whether included in the UN code or not, the ILO code, once approved, will join the OECD investment undertakings as one of the internationally functioning codes relating to international investment.

INTERNATIONAL INVESTMENT SURVEY ACT OF 1976

The International Investment Survey Act of 1976 (PL 94-472) authorizes the President to collect information on international investment and to provide analyses of information so collected to the Congress, agencies of the Executive Branch, and to the general public. This Act provides permanent and unambiguous authority for ongoing data collection programs on international capital flows plus new authority for conducting other benchmark and special studies in the international investment field.

The International Investment Survey Act requires that benchmark surveys of foreign direct investment and foreign portfolio investment in the United States be conducted every 5 years. In addition, the Act provides that U.S. direct investment abroad is to be the subject of a benchmark survey every 5 years, while a benchmark census of U.S. portfolio investment abroad must be undertaken at least once within the 5-year period following approval of the Act. The last previous benchmark surveys of foreign direct and portfolio investment in the United States were based on data collected for the year 1974 while the last census of United States direct investment abroad was based on 1966 data. Outward U.S. portfolio investment has not been surveyed since 1941.

The Commerce Department is preparing to undertake a benchmark survey of U.S. direct investment abroad on the basis of data for calendar year 1977 and an inter-agency committee, chaired by the Office of Management and Budget, has been reviewing the draft forms of the relevant data questionnaire. A significant element in this review procedure has been the solicitation of comments on the proposed survey from representatives of the business, labor and academic communities.

The International Investment Survey Act also calls for periodic studies and surveys of specific aspects of international investment which may have significant implications for the economic welfare and national security of the United States. One such study specifically mentioned in the Act calls for a study of the feasibility of establishing a nationwide multi-purpose land data system to monitor foreign direct investments in agricultural, rural, and urban real property. An interagency committee has been charged with reviewing the content and parameters of this study.

Reinforced by this Act, the Commerce Department is also continuing its special programs for monitoring, analyzing and reporting on foreign investments in the United States, programs which had been initiated pursuant to an Executive Order of May 1975.

ILLICIT PAYMENTS

During the period covered by this report of the National Advisory Council, the United States Government continued its efforts to deal with the problem of illicit payments in international commerce. In March 1977 the Secretary of the Treasury—while offering suggestions for improvements—testified in support of proposed legislation to criminalize corrupt payments to foreign officials by U.S. nationals and offered certain suggestions for improvements in the draft legislation under consideration. A Senate version of the legislation had passed unanimously by the end of the period covered by this report while the House of Representatives was still considering the draft legislation.

The United States Government continues to pursue its initiative in the United Nations for an international agreement on illicit payments. In response to a proposal made by the United States in March 1976, the United Nations Economic and Social Council (ECOSOC) established an 18-member Working Group to work out the scope and contents of an international agreement on this subject charged with reporting back to the ECOSOC during 1977. The ECOSOC received the report of this Working Group in July 1977 and adopted a Resolution composed of the following elements:

(a) Continuation and expansion of the Working Group;

(b) A mandate for the Working Group to draft an international agreement on illicit payments in 1978; and

(c) A recommendation that the United Nations General Assembly convene a diplomatic conference to conclude an agreement on this subject when appropriate.

This United Nations effort received the support of the Heads of Government at the London Economic Summit in May 1977 and of representatives of the member countries of the OECD at its Annual Ministerial Meeting in June 1977.

The United States proposes that the agreement on illicit payments encompass the following elements: (a) enforcement of traditional home and host country bribery laws; (b) home country criminal sanctions against the bribery of foreign officials where the act also violates the law of the host country; (c) reporting of agent fees to home and host country governments; and (d) the exchange of information and judicial assistance in enforcing these measures.

EXPROPRIATION

The expropriation of foreign investment remains a serious international problem, particularly as concerns the developing countries. Private investors are, furthermore, frequently confronted with actions which are expropriatory in effect (coerced sales, forced renegotiation of contracts or concessions, and confiscatory taxation, as examples) which stop short of formal expropriation *per se*. U.S. policy regarding expropriation was set forth in a Presidential statement of January 1972, which is still germane to the issue. In that statement, the United States acknowledges the sovereign right of a government to nationalize foreign property, *provided*, however, that such action does not violate prior commitments to the contrary and is carried out in accordance with the tenets of international law which require that the action be non-discriminatory, for a public purpose, and accompanied by prompt, adequate and effective compensation.

When expropriation—or expropriatory action—is taken, the United States generally prefers that the affected firm and government arrive at a mutually satisfactory solution of the particular case. In many cases such disputes are, in fact, successfully resolved without the direct involvement of the United States Government. In cases when the United States Government does, however, become actively involved, its efforts may range from simply encouraging the parties in dispute to negotiate a mutually satisfactory settlement to a more intensive involvement in the merits of a dispute —when such an effort appears warranted.

Legislative Background

Since the end of World War II the U.S. Congress has enacted several provisions of law providing for the imposition of sanctions against countries which expropriate properties in which American citizens hold 50 percent or more interest but which do not take reasonable steps to compensate the former owners. These basic statutory sanctions include the Hickenlooper Amendment, the Gonzalez Amendment, and certain provisions of the Trade Act of 1974.

The Hickenlooper Amendment requires the suspension of assistance provided under the Foreign Assistance and related Acts, including development loans and technical and military assistance. (Activities not subject to the Hickenlooper Amendment include the Peace Corps, the Export-Import Bank, short-term emergency disaster relief and certain PL–480 Title II humanitarian programs). The Gonzalez Amendment extends the foreign assistance prohibitions of the Hickenlooper Amendment to U.S. policies vis-a-vis the international development lending institutions. The Gonzalez Amendment requires the President to instruct the U.S. Executive Directors of the various international development lending institutions (the World Bank, the Asian Development Bank and the Inter-American Development Bank) to vote against lending bank resources to expropriating countries which have not provided prompt, adequate, or effective compensation; engaged in good faith negotiations to make such payments; or established a suitable mechanism to arrive at a solution, such as submitting the dispute to arbitration under the International Convention for the Settlement of Investment Disputes (ICSID). Finally, the Trade Act of 1974 requires the President to deny the benefits of our Generalized System of Preferences (GSP) to expropriating developing countries which have failed to pay or otherwise take reasonable steps toward paying prompt, adequate, and effective compensation for expropriated properties.

Policy Implementation

The Inter-Agency Staff Coordinating Group on Expropriation is the primary Executive Branch mechanism for coordinating implementation of U.S. expropriation policy. The 1972 Presidential statement and the implementing memorandum of March 8, 1972, continue to provide the basic framework for the operations of this Group. Meetings of this Group are normally held every 6 weeks or so but may also be convened more frequently as necessary, at the Chairman's initiative or at the request of any member. Participants usually include representatives of the Departments of State, Treasury, Commerce, and Defense, as well as the Agency for International Development and the Overseas Private Investment Corporation. Other Executive Branch agencies participate as appropriate.

This Group is responsible for determining whether an expropriation has occurred, for providing guidance as needed for action by the United States Government on behalf of an expropriated investor, and, when necessary, for recommending the imposition of legislative sanctions. Decisions are usually made on a consensus basis and on those occasions when disagreements cannot be resolved by discussions among staff of the agencies involved, higher policy level discussions may ensue.

Imposition of Sanctions

On January 12, 1974, the Peoples Republic of the Congo (PRC) issued a decree nationalizing eight oil companies, including Mobil and Texaco. These companies promptly submitted claims and on several occasions sought to enter into discussions or negotiations for a settlement of their claims, but no significant progress in that direction was made.

On December 9, 1976, the Special Trade Representative (STR) of the United States was informed of a determination made by the Expropriation Group that the PRC was not at that time satisfying the provisions of the Trade Act of 1974 as concerns expropriation of American-owned properties. As a consequence, the Gonzalez Amendment was invoked on December 14, 1976 and the U.S. Executive Director voted against an $8 million IDA (World Bank Group) loan to the PRC. On January 19, 1977, President Ford notified Congress of his intention to withdraw the PRC's eligibility for GSP benefits and the PRC was informed of this fact on February 18, 1977. In the U.S. note to the PRC it was made clear that in considering whether to implement withdrawal upon expiration of the required minimum period of prior notice (60 days) the United States would take into account any information received in the interim regarding steps taken to provide compensation to the concerned firms.

The 60 days minimum period terminated on April 18, 1977. During this interim period, the PRC invited the oil companies to discuss compensation and contacts were made between the parties which led to further discussions. In July 1977 the PRC and representatives of Texaco met and entered into substantive negotiations regarding compensation for the expropriated property.

OVERSEAS PRIVATE INVESTMENT CORPORATION (OPIC)

Since 1948 the United States Government has operated various types of investment insurance programs designed to protect private American overseas investments against the political risks of currency inconvertibility, expropriation and war. Currently, the principal purpose of these programs is to mobilize and facilitate the participation of American private capital and skills in the economic and social progress of friendly developing countries as a means of complementing U.S. bilateral development assistance programs in those countries. To help accomplish this objective, OPIC administers three types of programs: investment insurance, financing and investment information and promotion activities.

In its core program—insurance—OPIC has issued protection against three forms of risk associated with foreign investment. Maximum insured amounts as of September 30, 1977, were: (a) $3,377 million for expropriation risks; (b) $2,910 million for inconvertibility risks; and (c) $2,826 million for war, revolution and insurrection risks.

OPIC's finance program consists of: (a) investment guarantees on medium- and long-term loans from institutional lenders to private enterprises in developing countries and (b) direct loans to private projects in developing countries.

As of September 30, 1977, outstanding commitments under the investment guarantees program were $165 million and outstanding commitments under the direct loan program were $33 million.

Finally, as a means of identifying and assessing investment opportunities, and stimulating American private investment in the developing countries, OPIC operates a third program in which it identifies foreign investment opportunities and "brokers" these projects to U.S. investors. OPIC also provides financial, technical and other assistance to potential investors as part of its "brokering" activities. OPIC may not finance surveys for minerals, but is now seeking authorization to do so for minerals other than oil and gas.

OPIC wrote much less investment insurance during the period ending September 30, 1977, than in the previous U.S. fiscal year. Table 13 illustrates the severe decline in both dollar volume (maximum insured amount) and numbers of individual insurance coverages. Additional data on OPIC operations during the period covered by this report may be found in Section M of the Statistical Appendix.

The principal reasons for this decline in insurance contract signings appear to have been:

(a) A decline in eligible investment—While aggregate new American foreign investment continues at a high level, it is concentrated principally in the developed countries and in several Middle Eastern countries, rather than in the OPIC-eligible developing countries;

(b) Costs and restrictions—During the past 2 years, OPIC has introduced several risk management measures which have made clients more conscious of insurance terms and costs, causing some to self-insure and others to become more selective in their use of OPIC insurance. Among these measures are the fee-reopener clause, the retrospective premium adjustment plan, increasing requirements for partial self-insurance by investors, and other country concentration restrictions;

(c) Claims settlement—Prolonged and widely publicized claims situations—ITT, Anaconda, Revere—have also caused some U.S. companies to question the value of OPIC insurance, with some seeking alternatives to OPIC insurance.

Table 13.—*Political Risk Investment Insurance Comparison of Insurance Issued*
[In millions of dollars]

	June 30, 1976*		September 30, 1977**	
	Volume	Number of Contracts	Volume	Number of Contracts
Inconvertibility	$ 469.8	151	$255.0	87
Expropriation	476.1	133	268.9	91
War, Revolution, Insurrection	275.4	104	232.1	81
Totals	1,221.3	244	756.0	178

* Twelve months of U.S. fiscal year.
** Includes Transition Quarter data.
Source: Overseas Private Investment Corporation (OPIC).

OPIC's statutory authority to issue new insurance and investment guarantees is scheduled to expire on December 31, 1977. The United States Congress expressed its intention, at the time of OPIC's 1974 legislation, that OPIC should progressively increase private participation in its insurance functions, with the aim that OPIC withdraw completely from direct underwriting of inconvertibility and expropriation insurance by the end of 1979 and of war risk insurance by the end of 1980. OPIC experience in attracting the participation of private insurance companies in political risk underwriting makes it clear that this schedule is not feasible. The private sector will not take over all, or even the bulk of, the OPIC underwriting functions within the foreseeable future. Adherence to the original schedule would, in effect, terminate OPIC insurance operations, without the prospect of replacement by a comparable private sector facility.

In view of the expiration of the OPIC legislative mandate on December 31, 1977, the Administration completed a review of the OPIC insurance programs in May 1977. This review found OPIC's programs to be consistent with United States Government policies on international investment (described earlier in this Chapter) and concluded that OPIC could advance several United States foreign economic policy objectives and should be continued. It also was concluded that, with new program directions, OPIC could play a more important role in the future than it has in the past.

The new Administration concluded that three changes in the emphasis of OPIC programs are needed to enable it to play such a role. First, OPIC should focus its efforts more heavily on the poorer developing countries which have the greatest difficulty in attracting adequate flows of public and private development resources. Second, OPIC should develop innovative risk-reducing coverage for selected new investments in energy and other raw materials. Third, since OPIC cannot successfully pursue these and its other objectives if it must withdraw from direct insurance underwriting without any prospect of private insurance companies assuming the task, existing legislation should be modified to eliminate the "privatization" objective.

VII. POLICIES AND ISSUES IN FOREIGN INDEBTEDNESS

• The combined impact of oil price increase and recession continued to be reflected in rising levels of external indebtedness of the non-oil producing developing countries during 1975. The external public long-term debt outstanding of 75 non-oil producing developing countries rose from $82 billion at the end of calendar year 1974 to $100 billion by the end of calendar year 1975 (the latest year for which comprehensive data are available).

• The large current account payments deficits of these countries were financed through a combination of increased net official capital flows and a dramatic increase in net private capital flows, including, particularly, credits from private lenders. The principal recipients of private capital flows were the middle- and higher-income developing countries while the low-income developing countries, which usually do not have ready access to private markets, relied primarily on flows of concessional assistance from abroad.

• The external indebtedness of the developing countries continued to be the subject of concern and discussion in several international forums during the period covered by this report including, particularly, the UNCTAD and the Conference on International Economic Cooperation (CIEC).

• The United States opposes proposals calling for a generalized debt rescheduling or debt moratorium on the grounds that these are not appropriate instruments for alleviating the balance of payments problems of the developing countries. Generalized reschedulings or moratoria would be inequitable in that they disregard both the needs and performance of debtor countries and would reduce confidence among private lenders and thus tend to raise the cost of subsequent borrowing by developing countries.

• United States policy is to evaluate the merits of debt reorganization proposals on a case-by-case basis within the institutional framework of the "creditor club" mechanism. The United States does not reschedule debt as a means of bypassing budgetary and legislative processes for furnishing assistance to developing countries and, while the U.S. is sympathetic to the need for increasing the flow of resources to these countries it does not hold that debt relief should be considered separately as a means of resource transfer.

- The total principal outstanding on post-World War II foreign indebtedness to the United States Government was about $40 billion as of December 31, 1976. Of this amount, $39 billion was owed on long-term credits (maturities of over 1 year), $76 million was on short-term credits (maturities of 90 days to one year) and $704 million was on accounts receivable (maturities of less than 90 days).

- During the period January 1, 1976 to December 31, 1976, the United States collected more than $3.2 billion, in United States dollars, on account of principal and interest due on long-term dollar credits and the equivalent of almost $0.3 billion on account of principal and interest due on long-term credits repayable in foreign currencies. Arrearages on long-term debt to the United States declined by about $60 million during this period and constitute in any case but a very minor portion of total foreign debt falling due to, and being collected by, agencies of the United States Government.

DEBT SITUATION AND OUTLOOK FOR THE DEVELOPING COUNTRIES

The combined impact of oil price increases and the recession in most developed countries continued to be reflected in the rising levels of external indebtedness of the non-oil producing developing countries during calendar year 1975. These countries were able, by and large, to finance their large current account payments deficits with a combination of increased net official capital flows and a dramatic increase in net private capital flows, including, particularly, credits from private lenders. The middle- and higher-income developing countries were the principal recipients of these private capital flows, however, with the low-income developing countries (which generally do not have ready access to private funds) relying principally on flows of concessional assistance from abroad.

The external public long-term debt outstanding (disbursed basis) of 75 non-oil producing developing countries rose from $82 billion at the end of calendar year 1974 to $100 billion (equivalent) by the end of calendar year 1975 (the latest year for which comprehensive data are available). (World Bank external debt data are presented in Table 14 of this Report.) Preliminary estimates suggest that the external public long-term debt outstanding of the same 75 non-oil developing countries amounted to about $123 billion (equivalent) by the end of calendar year 1976.

Despite the sharp increase of public external indebtedness in nominal terms the non-oil developing countries as a group continued to maintain a relatively good record in terms of meeting principal and interest payments when due. Furthermore, after taking account of inflation, the real growth in the public external debt of these countries has slowed down, and the real burden of servicing each unit of debt incurred in past years has declined.

As indicated previously in this *Annual Report* of the NAC, the balance of payments situation of most non-oil developing countries[1] improved during 1976 and 1977. The reduction in the current account deficits of most of these countries, from an aggregate level of about $38 billion in 1975 to about $27 billion in 1976, has been particularly encouraging. This decline, which represents a sharp reversal of disturbing trends noted in 1974 and 1975, may be ascribed to the expansion of developing country exports to the OECD countries entering the recovery phase, to more favorable terms of trade, and to a slow-down in the growth of imports. While the diminished payments deficit of these countries might still appear disturbingly large, this level is not appreciably higher than the levels which prevailed in the late 1960's when compared with exports and aggregate GDP. Significantly, while the non-oil developing coun-

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[1] The composition of the group of non-oil developing countries used for providing balance of payments figures is different from the 75 non-oil developing countries used in the World Bank's Debtor Reporting System (DRS). The major difference is that the DRS includes 7 advanced Mediterranean countries which are excluded from the group used for balance of payments analysis purposes.

TABLE 14.—*84 Developing Countries—External Public Debt Outstanding, by Country and Type of Creditor, December 31, 1975*

[US$ millions]

Region, country	Disbursed only	Including undisbursed					
		Total	Bilateral official	Multi-lateral	Suppliers	Banks	Other
Africa South of the Sahara							
Benin, People's Republic of	93.7	161.2	83.5	51.5	12.7	18.5	...
Botswana	144.2	184.5	113.6	70.9	...	...	...
Burundi	14.6	34.7	3.6	22.2	4.2	2.0	2.6
Cameroon	361.7	688.1	364.3	239.1	10.1	73.1	1.5
Central African Empire	63.4	109.5	71.5	26.8	8.8	2.4	...
Chad	69.5	163.2	104.6	40.0	11.3	7.4	...
Congo, People's Republic of the	336.4	616.0	340.3	53.3	210.8	1.6	10.1
East African Community	279.8	344.5	99.0	198.9	11.4	...	35.2
Ethiopia	381.3	673.7	288.3	355.7	2.5	26.8	0.4
Gabon	454.0	515.1	99.6	46.7	86.9	241.9	40.1
Gambia, The	13.2	22.1	13.8	8.3	...	...	...
Ghana	603.8	797.3	392.3	221.0	184.1	...	...
Ivory Coast	973.8	1,537.4	313.3	384.5	409.6	373.0	57.1
Kenya	520.4	1,071.2	460.5	489.1	56.0	26.7	39.0
Lesotho	13.2	22.8	4.2	17.9	...	0.4	0.4
Liberia	169.7	274.6	166.1	90.0	10.7	6.9	0.9
Madagascar	167.9	236.5	98.7	126.9	3.8	3.9	3.1
Malawi	240.8	330.3	196.9	115.3	3.9	5.1	9.0
Mali	327.0	471.0	355.6	101.4	13.1	0.8	...
Mauritania	154.6	410.2	302.3	46.3	51.9	9.6	...
Mauritius	43.1	124.8	66.1	57.7	0.4	...	0.6
Niger	105.9	131.7	95.0	31.0	2.3	3.3	...
Nigeria	813.9	1,248.8	513.1	705.8	13.9	12.9	3.1
Rwanda	21.2	82.5	32.5	47.5	1.8	...	0.6
Senegal	288.6	503.0	223.8	141.9	14.8	95.6	27.0
Sierra Leone	163.3	198.3	67.3	51.3	63.9	...	15.8
Somalia	265.9	424.2	353.8	66.4	...	...	3.9
Sudan	941.7	1,534.8	584.1	364.7	172.6	406.4	7.1
Swaziland	46.2	66.5	36.4	28.6	1.5	...	...
Tanzania	789.9	1,192.5	802.2	335.3	29.1	12.3	13.6
Togo	103.4	156.7	53.4	29.6	25.5	44.5	3.7
Uganda	185.0	218.4	136.7	73.3	...	2.2	6.2
Upper Volta	62.9	186.0	116.7	68.7	0.6	...	...
Zaire	1,684.2	2,738.5	756.9	286.9	378.5	1,273.7	42.5
Zambia	953.4	1,464.7	513.4	380.8	140.9	407.1	22.5
Total	11,851.7	18,935.5	8,223.6	5,375.2	1,937.8	3,052.9	346.1
East Asia and Pacific							
China, Republic of	1,694.7	3,137.3	1,282.7	347.3	333.6	729.9	443.7
Fiji	49.2	80.4	36.0	29.9	0.7	...	13.7
Indonesia	8,124.1	11,764.3	5,834.3	1,288.7	1,728.4	2,516.6	396.3
Korea, Republic of	5,227.1	6,996.3	2,279.7	1,398.3	1,778.1	1,376.5	163.8
Malaysia	1,270.1	3,020.6	517.2	838.2	35.7	1,561.6	68.0
Philippines	1,282.6	2,567.4	824.1	983.5	107.2	572.5	80.2
Singapore	521.6	781.7	227.2	254.1	187.7	30.8	81.8
Thailand	615.5	1,293.2	416.8	808.6	22.0	45.8	...
Total	18,785.0	29,641.2	11,418.0	5,948.7	4,193.4	6,833.6	1,247.4
Latin America and the Caribbean							
Argentina	2,970.5	4,698.5	930.5	886.4	1,339.2	872.2	670.2
Bolivia	779.9	1,202.7	534.8	269.9	98.2	164.2	135.6
Brazil	11,459.3	14,121.0	2,864.1	3,068.8	1,349.3	6,424.3	414.4
Chile	3,559.6	4,142.7	2,094.9	392.0	710.5	422.1	523.2
Colombia	2,355.9	2,975.0	1,038.5	1,189.6	248.5	415.7	87.8

TABLE 14.—*84 Developing Countries—External Public Debt Outstanding, by Country and Type of Creditor, December 31, 1975*—**Continued**

[US$ millions]

Region, country	Disbursed only	Including undisbursed					
		Total	Bilateral official	Multi-lateral	Suppliers	Banks	Other
Costa Rica	410.2	691.1	137.3	352.7	31.8	157.4	11.9
Dominican Republic	439.7	710.1	341.5	165.1	7.8	166.2	29.5
Ecuador	429.5	753.4	200.8	309.7	85.4	136.9	20.6
El Salvador	204.9	395.8	98.2	205.0	...	87.1	5.5
Guatemala	172.1	288.1	104.4	169.2	5.9	8.3	0.4
Guyana	237.6	361.7	192.5	53.2	7.1	50.9	58.0
Honduras	272.7	440.1	124.9	291.7	11.6	11.9	...
Jamaica	647.4	812.7	165.9	157.2	22.1	413.9	53.5
Mexico	11,251.0	13,480.1	1,064.6	2,585.2	479.6	7,560.9	1,789.8
Nicaragua	600.0	782.4	206.5	216.4	17.5	234.6	107.4
Panama	655.7	961.0	194.5	177.6	37.1	519.0	32.9
Paraguay	175.6	368.8	161.0	127.0	37.5	43.1	0.1
Peru	2,670.1	3,466.1	1,071.6	306.8	427.9	1,553.9	105.9
Trinidad and Tobago	155.5	212.9	45.4	90.5	7.0	62.2	7.8
Uruguay	614.5	1,022.9	233.0	254.3	36.7	218.9	280.1
Venezuela	1,222.4	1,379.4	253.5	391.5	262.8	289.7	181.9
Total	41,284.4	53,266.4	12,058.5	11,659.8	5,218.4	19,813.2	4,516.6
North Africa and Middle East							
Algeria	4,526.9	9,003.1	1,780.9	234.8	3,377.8	3,477.3	132.3
Egypt, Arab Republic of	3,639.7	5,686.9	4,721.3	514.9	113.1	268.6	69.0
Iran	4,617.3	7,126.3	3,459.1	909.6	1,609.6	1,047.4	100.6
Iraq	596.1	1,132.0	484.1	135.0	12.9	500.0	...
Jordan	332.6	564.8	463.6	78.9	13.6	8.6	...
Morocco	1,593.4	2,461.9	1,141.1	478.3	276.2	539.5	26.7
Syrian Arab Republic	660.7	1,845.5	1,406.4	215.7	193.3	30.2	...
Tunisia	1,071.6	1,737.6	1,160.6	343.3	87.2	126.9	19.7
Total	17,038.2	29,558.1	14,617.2	2,910.5	5,683.6	5,998.5	348.2
South Asia							
Afghanistan	786.7	1,564.0	1,455.0	106.9	2.1	...	...
Bangladesh	1,621.7	2,582.5	1,624.5	779.4	163.3	15.3	...
Burma	278.8	531.1	322.9	171.3	36.8	...	...
India	11,538.7	14,580.1	9,061.7	5,065.0	352.8	98.6	2.0
Pakistan	5,095.7	6,328.1	4,781.0	1,300.3	146.4	100.2	0.1
Sri Lanka	600.7	997.4	665.8	197.3	134.1	...	0.4
Total	19,922.2	26,583.2	17,911.0	7,620.2	835.4	214.1	2.5
More advanced Mediterranean countries							
Cyprus	76.3	99.1	10.0	67.7	15.9	5.5	...
Greece	2,540.5	2,973.1	368.1	398.7	177.4	1,885.6	143.3
Malta	31.7	48.2	43.3	2.6	...	2.2	...
Portugal	665.9	966.5	211.7	39.0	334.4	329.9	51.4
Spain	3,333.1	3,922.9	942.9	431.7	83.7	1,967.6	497.0
Turkey	3,180.8	4,565.0	2,694.1	1,461.7	138.7	233.8	36.8
Yugoslavia	2,272.5	3,353.1	1,792.7	1,104.0	115.9	220.8	119.7
Total	12,100.9	15,927.7	6,062.9	3,505.4	865.9	4,645.3	848.3
Grand total	120,982.4	173,912.1	70,291.1	37,019.8	18,734.5	40,557.7	7,309.0

Source: World Bank.

tries continued heavy external borrowing during calendar year 1976, these countries also accumulated about $11 billion of reserve assets —compared with a $1 billion decline of reserve assets in calendar 1975. It should also be noted that GDP growth for these countries exceeded 5 percent in 1976 as compared with the 3.5 percent increase recorded in 1975.

Preliminary balance of payments estimates for calendar year 1977 indicate that the combined current account deficit of the non-oil developing countries will decline by about $3 billion as compared with 1976. This anticipated decrease should occur largely because of higher primary commodity export prices and a further slackening in the growth of imports. The lower current account deficit is likely also to have an impact on borrowing by these countries. During the first half of calendar 1977, borrowing by the non-oil developing countries from foreign private capital markets was at a somewhat reduced tempo as compared with the previous three years. Consequently, the external debt of these countries may increase less than 10 percent in 1977. This would represent a decline in their total external debt relative to aggregate GDP and exports. However, if the developing countries elect again to increase reserve assets substantially, borrowings may not decline for the year as a whole.

Despite this apparent improvement in the current account deficit of the developing countries in 1976 and 1977, the deficit remains large and, coupled with rising debt service requirements, will necessitate continuing relatively large amounts of external financing. Furthermore, it should be borne in mind that the aggregate data tend to conceal the serious difficulties confronting certain countries which have not yet adequately adjusted to the economic and financial shocks of 1973 and 1974.

In some developing countries, current account deficits have not declined and these countries have consequently experienced difficulties in borrowing at levels sufficient to finance the deficits. In only two exceptional cases, however, Zaire and Sierre Leone—was it found necessary to negotiate a multilateral rescheduling of external debt during 1977. Nevertheless, as long as the rate of accumulation of private external debt remains substantially above normal, many developing countries will need to continue to work to improve their current account positions in order to maintain the confidence of foreign creditors.

INTERNATIONAL CONSIDERATION OF DEVELOPING COUNTRIES' DEBT

The external indebtedness of the developing countries continued to be a subject of concern and discussion in several international forums during the period covered by this *Annual Report* of the NAC, including, particularly, the UNCTAD and the Conference on International Economic Cooperation (CIEC).

Developing country indebtedness was a major topic at the CIEC. The Group of Nineteen (G–19), which represented the developing countries in the CIEC, proposed a one-time operation of cancellation and/or relief of official debt of all "Most Seriously Affected," Least Developed, Land-Locked and Island Developing Countries, and other "interested" developing countries. The objectives of this proposal, which also called for the consolidation of external commercial debts, were stated to be to alleviate existing debt burdens, to restore the momentum of growth lost during recent economic crises, and to facilitate the achievement of international development targets. Another G–19 proposal would have reorganized and reoriented the existing creditor club and aid consortium mechanisms toward development needs and proposed adoption of debt relief as a form of resource transfer.

Representatives of Sweden tabled an alternative proposal at the CIEC calling for the developed countries to make a political commitment to provide additional official aid resources to the "Most Seriously Affected" and the least developed countries as a means of contributing to the alleviation of existing debt burdens. The additional resources needed under this Swedish proposal could be provided in the form of direct debt relief and/or equivalent measures.

The United States and the European Economic Community (EC) representatives presented a paper at the CIEC on "features" which could provide guidance on future operations relating to debt problems pursuant to the relevant UNCTAD Resolution (94 (IV)). This paper distinguished between situations involving imminent default and situations of a longer-term character involving structural and financial issues and transfer of resources cases in which an adverse balance of payments structure hampers development. In situations of default or imminent default, this proposal identified "features" to provide guidance to participants in creditor clubs. For situations of a longer-term nature, in which debt is an element in a structural balance of payments problem, the U.S.-E.C. paper recommended procedures for identifying, on a case-by-case basis, countries confronted with such situations and proposed appropriate steps to be taken, expeditiously, to assist in the development efforts of these countries.

The creditor countries rejected the G–19 proposals, at the CIEC, emphasizing that the diversity of external debt situations fully warranted continuation of the traditional case-by-case approach to debt problems. Furthermore, the creditor countries stressed that generalized debt relief was inappropriate since it would redistribute assistance in an arbitrary manner unrelated to country needs.

UNITED STATES GOVERNMENT POLICY ON DEBT RESCHEDULING

The United States Government has opposed a generalized debt rescheduling or debt moratorium in international forums on the grounds that these are not appropriate instruments for alleviating the balance of payments problems of the developing countries. The generalized rescheduling proposals already advanced have, in addition, serious shortcomings. A generalized rescheduling or moratorium would, for example, be inequitable in that it would disregard both the need and performance of debtor countries. The interests of the poorest among the developing countries would, moreover, clearly be better served by improvements in the quality and quantity of new assistance. Generalized debt relief proposals would also tend to reduce confidence among private lenders and thus tend to raise the cost of subsequent borrowing by developing countries in the short run and possibly adversely affect the flow of resources to those countries over the longer run—unless these countries achieve fundamental improvements in their financial situations.

United States policy is to evaluate the merits of debt reorganization proposals on a case-by-case basis within the institutional framework of the "creditor club" mechanism. While not insensitive to the specific financing problems facing many developing countries, the United States nonetheless emphasizes that balance of payments difficulties should be dealt with foremost through the adoption of appropriate domestic and external economic and financial policies designed to eliminate the need for debt relief. The United States also seeks to minimize the incidence and frequency of debt reschedulings and encourages debtor countries to make the necessary structural changes in their economies to avoid the need for future debt relief.

The United States does not reschedule debt as a means of bypassing normal budgetary and legislative processes for furnishing assistance to developing countries. Although the United States is sympathetic to the need for accelerating the flow of resources to these countries—and particularly to the poorest among them—it does not hold that debt relief should be considered separately as a means of resource transfer. Rather, debt relief, when essential, should be considered in the context of broad-gauged solutions involving official assistance, improved access to capital markets, direct investment flows, and specific financial programs formulated under the auspices of the IMF and the World Bank.

DEBT RESCHEDULING DURING 1977

The developing countries have, as a general rule, an excellent record in honoring their external debt obligations. Despite the economic and financial upheavals of the past few years, debt rescheduling has been the exception, rather than the rule, and when effected has typically helped ensure ultimate repayment by debtor countries. During U.S. fiscal year 1977, the United States participated in only one multilateral debt rescheduling meeting—for Zaire.

After the conclusion of an *ad referendum* debt rescheduling agreement in June 1976 by the "Paris Club" of creditor countries, a bilateral agreement between Zaire and the United States, signed on June 17, 1977, entered into force on August 30, 1977. This agreement provided for the rescheduling of approximately $46 million of debt service payments falling due during calendar years 1975 and 1976 on debts owed to, or guaranteed by, four United States Government agencies. Continued adverse economic conditions prompted the Government of Zaire to seek further debt reschedulings in 1977, and the Paris Club was convened again in July 1977 to negotiate an additional agreement. Under the terms of the July agreement, the Paris Club creditors agreed to reschedule 85 percent of the principal and interest falling due in the first half of 1977, plus 85 percent of principal only in the second half of 1977. During these negotiations, the creditor countries registered their concern that rescheduling agreements with private creditors should be based on comparable terms. It was further decided that the Paris Club would meet again in late 1977 to consider the Zaire debt situation and possible further rescheduling.

ROLE OF THE NATIONAL ADVISORY COUNCIL

The National Advisory Council continued its review and monitoring of the debt problems of the developing countries during fiscal year 1977 and also served as the coordinating body for developing United States Government positions on debt issues.

As noted in previous Reports of the Council, in October 1974, the National Advisory Council Alternates reviewed policy guidelines relating to the United States approach to debt rescheduling cases. At that time, the Council reaffirmed its position that there is a general presumption that borrowing countries will repay loans extended by agencies of the United States Government according to the agreed repayment schedules and, further, that they should be constrained to do so. It was further agreed that debt rescheduling was not to be considered an instrument for providing economic assistance to debtor countries.

During fiscal year 1977 the NAC served as the coordinating body for reviewing the Administration's Third Annual Report on Developing Countries External Debt and Debt Relief Provided by the United States. This Report, prescribed by Section 634(g) of the Foreign Assistance Act of 1961 as amended by the Foreign Assistance Act of 1973, was prepared by the Treasury Department and transmitted to the Congress on January 13, 1977. The Report reviews the external debt situation of the developing countries as of December 1974, balance of payments trends in the non-oil exporting developing countries for the period 1974 to 1977, and examines the implications of these trends for the developing countries' external debt position. The Report also contains detailed information on recent debt servicing problems encountered by major debtor countries, and the methods by which the United States and other creditor nations helped deal with these problems. A detailed account of the debt rescheduling arrangements in which the United States participated during fiscal year 1976 is also included in the Report.

FOREIGN INDEBTEDNESS TO THE UNITED STATES GOVERNMENT

The total principal outstanding on post-World War II foreign indebtedness to the United States Government was about $40 billion as of December 31, 1976. Of this amount, $39 billion was owed on long-term credits (maturities of over 1 year), $76 million was on short-term credits (maturities of 90 days to 1 year) and $704 million was on accounts receivable (maturities of less than 90 days). The bulk of this long-term foreign debt relates to U.S. foreign economic and military aid and export credit programs undertaken during the past 30 years. Some $17 billion of the indebtedness was contracted under the Foreign Assistance Act (and predecessor legislation). In addition, some $6 billion was contracted under Public Law 480 programs, some $12 billion under the Export-Import Bank Act and the Commodity Credit Corporation Charter Act; and $1.4 billion stems from activities directly related to World War II—primarily Lend-Lease and Surplus Property disposal programs.

Since the purpose of most of these loans was to promote economic development and assist in the sale of exports of U.S. goods and services, most (about 70 percent by value) of this debt is owed by the non-oil exporting developing countries.

With regard to long-term debt, the largest individual foreign debtors to the United States Government among the developing countries are: India ($3.6 billion), Israel ($2.8 billion), Pakistan ($2.5 billion), Brazil ($2.3 billion), Korea ($1.7 billion), Indonesia ($1.6 billion), and Turkey ($1.6 billion).

ARREARAGES ON FOREIGN INDEBTEDNESS TO THE UNITED STATES GOVERNMENT

Agencies of the United States Government emphasize the importance of prompt and on-time payment of foreign debt owed the United States. Congress requires regular reporting (under Section 634(f) of the Foreign Assistance Act, for example) on the status of foreign debts owed to the United States and Congressional hearings on this subject are held from time to time. The most recent such hearing was held by the Legislation and National Security Subcommittee of the House Committee on Government Operations on March 4, 1976.

The National Advisory Council plays important continuing oversight and coordination roles with respect to the identification and collection of delinquent debts owed to the United States Government. At its weekly Staff Committee meetings during which the Council agencies consider, and make recommendations on, proposed loans by United States Government agencies and by the international financial institutions (e.g., the World Bank) the status of arrearages and delinquencies on indebtedness to the United States by the countries involved is reviewed in detail. An NAC Working Group on foreign debt arrearages, established to coordinate activities under a new Government-wide standard collection procedure and to advise the National Advisory Council Staff Committee on significant debt arrearages involving serious collection problems, conducts quarterly reviews of agency collection efforts which resulted in improved collections and reduced arrearages.

These NAC activities accord with the terms of a National Advisory Council Action dated September 15, 1971, which states *inter alia* that:

> "The National Advisory Council believes that the existence of significant debt arrearages to the U.S. Government or its agencies is an important consideration in passing judgment on specific loan proposals. As a general policy, the Council recommends that loans to countries whose governments are in arrears 90 days or more on debts which they or their agencies owe to the U.S. Government or its agencies should be deferred and, where appropriate, disapproved. Exceptions to this general rule must be explicitly approved."

The National Advisory Council holds special meetings at the staff level periodically in which representatives of all major United States Government creditor agencies participate, to review foreign debt problems and to discuss ways and means of improving debt collection efforts.

As has already been noted, it is United States Government policy that its agencies should extend credits and loans to foreign countries and entities on the explicit understanding that repayments will be made in accordance with the contractual terms and conditions agreed upon by the borrower at the time the loans or credits are authorized and signed. Since World War II, the vast majority of debt payments due to the United States have been paid on time—of the total principal amount outstanding on long-term foreign indebtedness to the United States Government as of December 31, 1976, (excluding World War I debts), less than 1 percent was due and unpaid 90 days or more (See Table 15.).

During the 12-month period January 1, 1976 to December 31, 1976, the United States collected over $3.2 billion, in United States dollars, on account of principal and interest due on long-term dollar credits and the equivalent of almost $0.3 billion on account of principal and interest due on long-term credits repayable in foreign currencies. Arrearages on long-term debt to the United States declined by about $60 million during this period. While part of this reduction in long-term arrearages may be ascribed to debt rescheduling agreements, the amount actually collected on foreign debts to the United States Government far exceeded new arrearages incurred. In sum, ar-

TABLE 15.—*Arrearages on long-term U.S. Government foreign credits extended during and since World War II, as of December 31, 1976*

[In millions of dollars and equivalents]

	War connected activities[1]	Foreign assistance activities							
		Export financing[2]	Public Law 480 programs	Foreign Assistance Acts[3]		Other[3]	Total	Arrearages as percent of—	
				Country loans	Financing military purchases			Credits utilized	Principal outstanding
Credits utilized	5,341	30,134	11,790	16,762	4,793	5,574	74,393	....	....
Repaid[4]	4,216	18,748	4,155	3,903	1,331	2,468	34,820	....	....
Adjustments (net deduction)[5]	8	4	1,402	37	....	14	1,465	....	....
Principal outstanding	1,421	11,517	6,208	12,823	3,462	3,389	38,821	....	....
Arrearages:									
On principal	79	47	9	10	6	1	152	0.2	0.4
On interest	49	44	10	5	1	1	110	0.1	0.3
Subtotal[6]	129	91	18	15	7	2	262	0.4	0.7
Other[7]		48	....	....	....	....	48	0.1	0.1
Total	129	139	18	15	7	2	310	0.4	0.8

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[1] Includes lend-lease and overseas surplus property sales.

[2] Includes Export-Import Bank and CCC general sales manager programs.

[3] Includes activity under Foreign Assistance Act and related programs. Activity for programs other than that explicitly shown is included in "Other"; see table B-2 in the Statistical Appendix.

[4] Includes repayments of $743 million on credits outstanding on July 1, 1975, and not included in "Credits utilized" above.

[5] Includes write-offs of principal, revaluations of indebtedness repayable in foreign currencies, and adjustments to outstanding principal for discount allowance for extraordinary prepayments.

[6] Table B-10 in the Statistical Appendix indicates principal and interest payments due and unpaid 90 days or more on long-term indebtedness on Dec. 31, 1976, totaling $262 million. This excludes $48.5 million of principal and interest due from the Republic of China for assets left on the Asian continent, for which Export-Import Bank by agreement with that Government has deferred from pressing.

[7] For the purposes of the present debt review, the Council has also included in the delinquent figures that portion of the Republic of China debt to Export-Import Bank ($48.5 million) referred to in footnote 6 above.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, from information made available by operation agencies.

rearages constitute but a very minor portion of total foreign debt falling due to, and being collected by, agencies of the United States Government.

As of December 31, 1976, the total principal and interest delinquent 90 or more days on long-term and short-term credits and accounts receivable was $877 million. This compares with total delinquencies of $748 million as of December 31, 1975. This increase was due to a $190 million increase in short-term and accounts receivable arrearages on military sales program account, offset to some extent by reductions in arrearages in other programs. Intensive collection efforts by the Department of Defense during the period covered by this Report of the Council reduced arrearages on its programs by about $280 million between December 31, 1976, and March 31, 1977. This favorable trend in reducing military debt arrearages can be expected to continue.

It should be pointed out, however, that there are certain cases which are difficult to resolve through normal collection procedures. More than half of total long-term, short-term, and accounts receivable arrearages are, for example, complicated by extraordinary political situations. The largest arrearage in this category—$199 million—relates to military logistical support provided by the United States to third countries during the Korean conflict. While the United States has reached formal agreement for repayment of this assistance with fourteen countries, the accounts of six other countries have never been regularized. These Korean conflict claims are complex and present a unique situation as is illustrated by the fact that the Thirty-Seventh Report (1976) of the House Committee on Government Operations recommended that "Congress should consider legislation removing the Korean War debt claims against Colombia, Ethiopia, Greece, the Philippines, Thailand, and Turkey from the Treasury Department's category of outstanding U.S. debts."

Chinese debt delinquencies total approximately $106 million[3] and involve a number of problems, including the proper allocation of claims between the Republic of China and the People's Republic of China, the correct evaluation of the amount of the claims, and issues relating to government succession. It has not been feasible to negotiate a settlement of Cuba's $70 million debt to United States Government agencies (mainly the Export-Import Bank) in the present state of United States-Cuba relationships. Nevertheless, the United States intends to pursue this debt, as well as the outstanding United States Government and private claims against Cuba as soon as our bilateral relations with that country permit. Collection of over $10 million of debts owed by Cambodia and Vietnam may also be politically difficult.

During the past 4 years, the United States Government has been in regular communication with Iranian Government authorities in an effort to collect arrearages of $35 million owed on several Lend-Lease and Surplus Property agreements signed during the period 1945 to 1948. Efforts to collect these arrearages, on which payments were halted during the period of instability of the 1950's, are receiving priority attention and some payments have been received. In December 1974, Iran presented a note to the United States detailing claims totaling approximately $172 million, stemming from alleged damages to Iranian railways by the Allied military forces during World War II and requested that discussion of the Iranian Lend-Lease debts coincide with the discussion of these claims against the United States.

The United States has discussed these Iranian claims but stresses there is no legal or factual connection between the Iranian claims and the Lend-Lease and Surplus Property debts owed to the United States. Iran has not disputed the validity of its obligations to the United States and made payments of $750,000 in March 1973 and $1.8 million in October 1975. Iranian representatives have stated, however, that further payments would be contingent on negotiation of Iranian claims against the United States. The United States welcomed the latest payments on the Lend-Lease debt but continues to emphasize the importance of full and prompt repayment of the outstanding balance.

The remaining category of other long-term, short-term, and accounts receivable arrearages totaled about $205 million as of December 31, 1976. Many of these arrearages reflect technical and administrative problems or bankruptcies in the private sector.

UNITED STATES GOVERNMENT CLAIMS AGAINST FOREIGN GOVERNMENTS

During the hearings held by the House Committee on Government Operations (Subcommittee on Legislation and National Security) on March 4, 1976, the Treasury Department was requested to develop and refine a claims accounting system. In compliance with this request, Treasury began development of a claims reporting system and submitted a preliminary report on significant unsettled United States Government claims against foreign governments to the Congress on June 3, 1976. Since submission of that preliminary report, the claims reporting system has been expanded and refined and the first comprehensive claims report was submitted to Congress in late 1977.

A claim against a foreign government is defined as an amount the United States Government asserts, or may in the future wish to assert, is owed to the United States, but which the foreign government disputes. When the foreign government and the United States Government agree on a specific amount and terms of payment, the claim becomes a debt. Because of the nature of claims and the negotiation process, the Treasury reports do not specify precise amounts for these claims, the largest of which are against China and Cuba. Pursuit of these particular claims is, furthermore, complicated by the same special political problems which impede debt arrearage settlements with these countries.

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[3] Excludes $48.5 million of principal and interest due from the Republic of China for assets left on the Asian continent for which the Export-Import Bank, by agreement with that Government, has deferred from pressing.

WORLD WAR I DEBTS

During and immediately after World War I, the Allied Powers borrowed about $10 billion from the United States. After deducting repayment of $3 billion and taking into account unpaid interest charges which now exceed the amount of the original borrowing, the outstanding foreign indebtedness to the United States Government on World War I account totaled approximately $25 billion as of September 30, 1977, of which $22 billion was delinquent. The largest of these due and unpaid accounts are with the United Kingdom ($11 billion), France ($8 billion), and Italy ($2 billion). In addition to these Allied debts, there is outstanding German indebtedness of about 5 billion Reichsmarks (approximately $2 billion at the rate of exchange at the time of default) to the United States Government.

These World War I debts present special problems. After the war the United States collected about $1 billion on the initial Allied borrowings. Collection was, however, complicated by the general financial disorders which prevailed during the postwar period and the United States concluded debt funding agreements with most of these countries between 1923 and 1930. Most debtor countries fulfilled their commitments under these debt funding agreements until 1933/34. Except for a few countries, however, the debtor governments have made no payments to the United States since then. Total collections under these funding agreements amounted to about $2 billion as of September 30, 1977. The principal debtor governments (except the Soviet Union which, in January 1918, repudiated all foreign debt incurred during the former Czarist regime) have never denied the legal validity of the debts.

These debts are, as a practical matter, inextricably linked to the question of German war reparations and the intra-European debts generated during World War I. Many European countries are net creditors on account of World War I debt, with Germany owing more to them than they in turn owe to the United States. Since the early 1930's these countries have steadfastly maintained they would resume payments on their war debts to the United States only if and when the issue of Germany's World War I reparations was satisfactorily settled. While the United States has never recognized any legal connection between the World War I debt obligations owed to this country and reparation claims on Germany, there is a linkage in reality.

Under the 1953 London Agreement on German external debts, to which the United States is a party, resolution of the problem of intergovernment claims against Germany arising from World War I was deferred "until a final general settlement of this matter." This agreement was ratified by the United States Senate and has the status of a treaty. Under the terms of this agreement, the Federal Republic of Germany agreed to pay the United States Government $97.5 million to settle claims of American nationals, and under a 1969 agreement the Federal Republic of Germany provided the funds needed to liquidate this indebtedness by 1978.

In December 1976 the Government of the Hungarian People's Republic made full payment, in the amount of $4,327,271.44, of all installments of indebtedness owed by it to the United States through December 15, 1976. As a result of this payment, the restrictions of the Johnson Act ceased to apply to Hungary. (The Johnson Act prohibits persons within the United States from trading in the securities of, or making loans to, any foreign government in default in the payment of its obligations to the United States, unless the foreign government is a member of both the International Monetary Fund and the World Bank). The Hungarian indebtedness, the last installment of which is due in 1985, arises from a post-World War I relief loan made by the United States for the purchase of flour.

DEBT REPORTING AND COLLECTION PROCEDURES

Under section 634(f) of the Foreign Assistance Act as amended, the Treasury Department is responsible for the compilation of data (including arrearages) on foreign indebtedness owed to the United States Government. Treasury regularly receives from U.S. Government agencies quarterly statements of long-term and short-term debts and accounts receivable owed to the United States by foreigners. Information is also being compiled on debts in each category which are due and unpaid 90 days or more. These data are used as a basis for taking appropriate steps to insure the prompt collection of debts, as well as in assisting Congress in its activities in this area.

The National Advisory Council has standardized United States Government procedures for collecting foreign debt arrearages. Primary responsibility for collection lies with the creditor agency. In cases where the vigorous efforts of a creditor agency are not successful in collecting significant arrearages, however, the agency may request the Department of State to provide assistance and the National Advisory Council is notified. If State Department efforts are not successful, the National Advisory Council reviews the arrearage case and recommends further steps in the collection efforts, including the use of the formal NAC procedure for the deferral or disapproval of proposed loans to countries whose governments are in arrears 90 days or more on debts which they, or their agencies, owe to the United States Government or to its agencies.

APPENDIX A

ORGANIZATION, FUNCTIONS AND OPERATIONS OF THE NATIONAL ADVISORY COUNCIL ON INTERNATIONAL MONETARY AND FINANCIAL POLICIES

Organization and Functions

The National Advisory Council on International Monetary and Financial Policies (NAC) is responsible for coordinating United States participation in the international financial institutions and the policies and practices of all agencies of the U.S. Government which make, or participate in making, foreign loans or which engage in foreign financial, exchange, or monetary transactions.

The NAC, originally created by the Bretton Woods Agreements Act of July 31, 1945, was abolished, as a statutory entity, under the terms of Executive Reorganization Plan No. IV of 1965, which transferred its functions to the President of the United States. With a few changes in the Council's functions, Executive Orders No. 11238 (July 28, 1965) and No. 11269 (February 14, 1966) reestablished the NAC without any change in membership, with effect as of January 1, 1966. The reorganization arrangements authorized the Secretary of the Treasury to "instruct representatives of the United States to the international financial organizations," a function with which the NAC, as a statutory entity, had previously been charged. The texts of Executive Orders No. 11238 and No. 11269, and relevant sections of the Bretton Woods Agreements Act Relating to the National Advisory Council are contained in the latter section of this Appendix to the Council's annual report.

The NAC is an advisory body authorized, *inter alia*, to review individual loans and other proposed transactions and programs to the extent necessary or desirable to coordinate U.S. policies. The Council seeks to assure that, to the maximum extent possible, the operations of the international financial institutions, such as the World Bank, the Inter-American Development Bank, the Asian Development Bank, and the African Development Fund are conducted in a manner consonant with U.S. policies and objectives and with the lending and other foreign financial activities of United States Government agencies.

The NAC formulates and reviews policies and programs for use by U.S. representatives to these institutions and provides advice to the Secretary of the Treasury, as U.S. Governor of the international financial institutions, on the policies and proposed transactions of the institutions. The NAC also advises the Secretary of the Treasury on proposed actions by these institutions requiring United States approval on such subjects as the flotation of securities, increases in quotas and subscriptions, and changes in their Articles of Agreement. The NAC may also render its advice on certain problems relating to the administration and management of the international financial institutions and is the mechanism utilized to provide the oversight required to assure that these institutions are efficiently fulfilling their functions and making effective use of the resources made available to them.

The members of the NAC, at the Principal's level, as of September 30, 1977, were as follows:

The Secretary of the Treasury, W. Michael Blumenthal, *Chairman*.

The Secretary of State, Cyrus R. Vance.

The Secretary of Commerce, Juanita Morris Kreps.

The Chairman of the Board of Governors of the Federal Reserve System, Arthur F. Burns.

The President and Chairman of the Board of Directors of the Export-Import Bank of the United States, John L. Moore, Jr.

The NAC is served by a Committee of Alternates, at the Assistant Secretary level, empowered to act for their Principals. By agreement, the following served as NAC Alternates as of September 30, 1977:

C. Fred Bergsten, Assistant Secretary of the Treasury for International Affairs.

Julius L. Katz, Assistant Secretary of State for Economic and Business Affairs.

Frank A. Weil, Assistant Secretary of Commerce for Domestic and International Business.

Henry C. Wallich, Member, Board of Governors of the Federal Reserve System.

Delio E. Gianturco, First Vice President and Vice Chairman, Export-Import Bank of the United States.

Informal meetings of the NAC for preliminary policy-level discussions of upcoming international issues and problems are also held from time to time. These sessions are designed to provide informal guidance to NAC agencies on policy matters, to establish work programs for the NAC Alternates and, as necessary, to direct the activity of the NAC Staff Committee and of the various NAC Working Groups.

The NAC is served by a Staff Committee, comprising economists, lawyers, and other professional members of NAC agencies, which meets at least once a week throughout the year to review international monetary and financial transactions within the NAC's areas of responsibility. *The bulk of the day-to-day work of the NAC is conducted by this Staff Committee at its regular Tuesday afternoon meetings.* Representatives of other agencies of the U.S. Government such as the Departments of Defense and Agriculture, and representatives of AID, DOT, NSC, and the OMB participate in the work of the NAC on a regular basis as appropriate. The NAC also utilizes *ad hoc* working groups to consider particular issues and report recommendations to the NAC Staff Committee.

U.S. representatives to the international financial institutions located in Washington and their staffs participate in the work of the NAC on a regular basis. They were, at the end of the period under review:

U.S. Executive Director of the International Monetary Fund, Sam Y. Cross (Thomas B. C. Leddy, Alternate).

U.S. Executive Director of the International Bank for Reconstruction and Development and of the International Development Association and U.S. Director of the International Finance Corporation, Edward R. Fried (Hal F. Reynolds, Alternate).

U.S. Executive Director of the Inter-American Development Bank, Ralph A. Dungan (E. Jay Finkel, Alternate).

U.S. Director of the Asian Development Bank, Lester E. Edmond (James E. Westcott, Alternate).

(The Office of the U.S. Director of the Asian Development Bank—USADB—is located at the Bank's headquarters in Manila, the Philippines. NAC consultations and coordination with both USADB and U.S. Embassies in loan recipient countries are carried out by cable and letter.)

Robert S. Watson (Treasury) is the Secretary of the NAC and Chairman of the NAC Staff Committee. He is also responsible for compiling and editing the Annual Report of the Council. William C. Grant (Treasury) is deputy to the Secretary of the NAC and serves as Secretary of the weekly meetings of the NAC Staff Committee.

Operations

Throughout its more than 30 years of experience, the NAC has been a unique mechanism for bringing timely high-level inter-departmental focus on a wide spectrum of international financial and monetary problems confronting the United States. The NAC maximizes effectiveness in the exchange of information and views among participating agencies necessary for the full consideration of policy options. Formal meetings of the Staff Committee are held at least weekly throughout the year. (There were 56 Staff Committee meetings during fiscal year 1977.) The NAC Principals and their Alternates meet, formally and less frequently, on call. (There were seven formal meetings of the NAC Alternates during the period covered by this report of the Council.) In addition to these structured meetings of the NAC, informal contact at all levels amongst the member and participating NAC agencies is maintained on a regular, intensive, basis throughout the year.

Through the Office of the Secretary of the NAC, which is staffed by the Treasury Department, documents and memoranda pertaining to the work of the NAC are received from, and circulated to, the various participating agencies. Each agency assigns professional staff personnel to the work of scrutinizing the documentation associated with each proposal in the light of that agency's particular responsibilities and interests.

Following in-depth analysis and discussion of each pending proposal, such as an individual loan proposal, the NAC normally takes a poll of member agencies to determine the consensus position, which is recorded in a document denominated as an NAC "Action." During fiscal year 1977 the NAC took 726 formal Actions on individual proposals and policy and program questions (as compared with 816 Actions during fiscal 1976). In addition, many subjects were discussed or reviewed which did not require formal NAC Actions.

The Council seeks, where possible, unanimity of views. Nevertheless, split voting occurs. In such cases, this may signal that a particular aspect of U.S. policy needs special review. It should be stressed, however, that in all cases, NAC Actions are taken on behalf of the Council Principals to ensure that appropriate policy-level attention is focussed on the particular policy issue or transaction involved.

The NAC reports annually to the President and to the Congress on its activities. It also prepares, as necessary, special reports on such topics as proposed replenishments of the resources of the multilateral development banks, debt reschedulings, and other significant topics involving international monetary and financial affairs. A recent example of such reports is the *NAC Special Report to the President and to the Congress on United States Participation in the Supplementary Financing Facility of the International Monetary Fund* (House Document 95–224, September 20, 1977).

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Executive Order No. 11238

JULY 28, 1965.

THE NATIONAL ADVISORY COUNCIL ON INTERNATIONAL MONETARY AND FINANCIAL PROBLEMS

By virtue of the authority vested in me by Reorganization Plan No. 4 of 1965, and as President of the United States, it is ordered as follows:

SECTION 1. There is hereby established a new "National Advisory Council on International Monetary and Financial Problems." That Council shall have the same membership, functions, and status as the Council of the same name established by Section 4 of the Bretton Woods Agreements Act (59 Stat. 512; 22 U.S.C. 286b) had immediately prior to the taking effect of Reorganization Plan No. 4 of 1965.

SEC. 2. This Order shall be effective as of July 27, 1965, and, together with the Council established by Section 1, shall terminate on January 1, 1966, or on such earlier date as may hereafter be prescribed.[1]

LYNDON B. JOHNSON.

THE WHITE HOUSE.

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[1] See E.O. 11269, following.

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Executive Order No. 11269

FEBRUARY 14, 1966.

NATIONAL ADVISORY COUNCIL ON INTERNATIONAL MONETARY AND FINANCIAL POLICIES

By virtue of the authority vested in me by Reorganization Plan No. 4 of 1965 (30 F.R. 9535), and as President of the United States, it is ordered as follows:

SECTION 1. Establishment of Council. (a) There is hereby established the National Advisory Council on International Monetary and Financial Policies, hereinafter referred to as the Council.

(b) The Council shall be composed of the following members: the Secretary of the Treasury, who shall be the Chairman of the Council, the

Secretary of State, the Secretary of Commerce, the Chairman of the Board of Governors of the Federal Reserve System, and the President of the Export-Import Bank of Washington.

(c) Whenever matters within the jurisdiction of the Council may be of interest to Federal agencies not represented on the Council under Section 1(b) of this order, the Chairman of the Council may consult with such agencies and may invite them to designate representatives to participate in meetings and deliberations of the Council.

SEC. 2. Functions of the Council. (a) Exclusive of the functions delegated by the provisions of Section 3, below, and subject to the limitations contained in subsection (b) of this Section, all of the functions which are now vested in the President in consequence of their transfer to him effected by the provisions of Section 1(b) of Reorganization Plan No. 4 of 1965 are hereby delegated to the Council.

(b) The functions under Sections 4(a) and 4(b)(3) of the Bretton Woods Agreements Act, including those made applicable to the International Finance Corporation, the Inter-American Development Bank, and the International Development Association (22 U.S.C. 286b(a) and (b)(3); 283b; 284b), to the extent that such functions consist of coordination of policies, are hereby delegated to the Council. The functions so delegated shall be deemed to include the authority to review proposed individual loan, financial, exchange, or monetary transactions to the extent necessary or desirable to effectuate the coordination of policies.

(c) The Council shall perform with respect to the Asian Development Bank and African Development Fund, the same functions as those delegated to it by subsections (a) and (b) of this section with respect to other international financial institutions.

SEC. 3. Functions of the Secretary of the Treasury. (a) Functions which are now vested in the President in consequence of their transfer to him effected by the provisions of Section 1(b) of Reorganization Plan No. 4 of 1965 are hereby delegated to the Secretary of the Treasury to the extent of the following:

(1) Authority to instruct representatives of the United States to international financial organizations.

(2) Authority provided for in Section 4(b)(4) of the Bretton Woods Agreements Act (22 U.S.C. 286b(b)(4)).

(b) In carrying out the functions delegated to him by subsection (a) of this Section the Secretary shall consult with the Council.

(c) Nothing in this order shall be deemed to derogate from the responsibilities of the Secretary of State with respect to the foreign policy of the United States.

(d) The Secretary of the Treasury shall perform, with respect to the Asian Development Bank and African Development Fund, the same functions as those delegated to him by subsections (a) and (b) of this section with respect to other international financial institutions.

(e) The Secretary of the Treasury is hereby delegated the functions conferred upon the President by Section 203(b) and Section 207 of the Act of May 31, 1976 (90 Stat. 593 and 594, 22 U.S.C. 290g–1 and 290g–5).

SEC. 4. Information. (a) All agencies and officers of the Government, including representatives of the United States to international financial organizations, (1) shall keep the Council or the Secretary of the Treasury, as the case may be, fully informed concerning the foreign loan, financial, exchange, and monetary transactions in which they engage or may engage or with respect to which they have other responsibility, and (2) shall provide the Council and the Secretary with such further information or data in their possession as the Council or the Secretary, as the case may be, may deem necessary to the appropriate discharge of the responsibilities of the Council and Secretary under Sections 2 and 3 of this order, respectively.

(b) The Council shall from time to time transmit to all appropriate agencies and officers of the Government statements of the policies of the Council under this order and such other information relating to the above-mentioned transactions or to the functions of the Council hereunder as the Council shall deem desirable.

SEC. 5. Executive Order No. 10033. Section 2(a) of Executive Order No. 10033 of February 8, 1949, is hereby amended by substituting for the name "National Advisory Council on International Monetary and Financial Problems."

SEC. 6. Effective date. The provisions of this order shall be effective as of January 1, 1966.

Lyndon B. Johnson.

The White House.

SECTIONS OF THE BRETTON WOODS AGREEMENTS ACT AS AMENDED RELATING TO THE NATIONAL ADVISORY COUNCIL

(59 Stat. 512; 22 U.S.C. 286b, 286k, 286k-1)

NATIONAL ADVISORY COUNCIL ON INTERNATIONAL MONETARY AND FINANCIAL PROBLEMS

SEC. 4. (a) In order to coordinate the policies and operations of the representatives of the United States on the Fund and the Bank and of all agencies of the Government which make or participate in making foreign loans or which engage in foreign financial, exchange or monetary transactions, there is established the National Advisory Council on International Monetary and Financial Problems (hereinafter referred to as the "Council"), consisting of the Secretary of the Treasury, as Chairman, the Secretary of State, the Secretary of Commerce, the Chairman of the Board of Governors of the Federal Reserve System, the President of the Export-Import Bank of Washington, and during such period as the Foreign Operations Administration shall continue to exist, the Director of the Foreign Operations Administration. (As amended by 62 Stat. 137, 141; 65 Stat. 373, 378; 68 Stat. 678.)[1]

(b) (1) The Council, after consultation with the representatives of the United States on the Fund and the Bank, shall recommend to the President general policy directives for the guidance of the representatives of the United States on the Fund and the Bank.

(2) The Council shall advise and consult with the President and the representatives of the United States on the Fund and the Bank on major problems arising in the administration of the Fund and the Bank.

(3) The Council shall coordinate, by consultation or otherwise, so far as is practicable, the policies and operations of the representatives of the United States on the Fund and the Bank, the Export-Import Bank of Washington and all other agencies of the Government to the extent that they make or participate in the making of foreign loans or engage in foreign financial, exchange or monetary transactions.

(4) Whenever, under the Articles of Agreement of the Fund or the Articles of Agreement of the Bank, the approval, consent, or agreement of the United States is required before an act may be done by the respective institutions, the decision as to whether such approval, consent, or agreement, shall be given or refused shall (to the extent such decision is not prohibited by section 5 of this Act) be made by the Council, under the general direction of the President. No governor, executive director, or alternate representing the United States shall vote in favor of any waiver of condition under Article V, section 4, or in favor of any declaration of the United States dollar as a scarce currency under Article VII, section 3, of the Articles of Agreement of the Fund, without prior approval of the Council.

(5) The Council shall transmit to the President and to the Congress an annual report with respect to the participation of the United States in the Fund and Bank.

(6) Each such report shall contain such data concerning the operations and policies of the Fund and Bank, such recommendations concerning the Fund and the Bank, and such other data and material as the Council may deem appropriate.

(7) The Council shall make such reports and recommendations to the President as he may from time to time request, or as the Council may consider necessary to more effectively or efficiently accomplish the purposes of this Act or the purposes for which the Council is created.

(c) The representatives of the United States on the Fund and the Bank, and the Export-Import Bank of Washington (and all other agencies of the Government to the extent that they make or participate in the making of foreign loans or engage in foreign financial, exchange or monetary transactions) shall keep the Council fully informed of their activities and shall provide the Council with such further information or data in their possession as the Council may deem necessary to the appropriate discharge of its responsibilities under this Act.

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[1] See section 4 of the IFC Act, section 4 of the IDB Act, section 4 of the IDA Act, all cited below.

FURTHER PROMOTION OF INTERNATIONAL ECONOMIC RELATIONS

SEC. 14. In the realization that additional measures of international economic cooperation are necessary to facilitate the expansion and balanced growth of international trade and render most effective the operations of the Fund and the Bank, it is hereby declared to be the policy of the United States to seek to bring about further agreement and cooperation among nations and international bodies as soon as possible, on ways and means which will best reduce obstacles to and restrictions upon international trade, eliminate unfair trade practices, promote mutually advantageous commercial relations, and otherwise facilitate the expansion and balanced growth of international trade and promote the stability of international economic relations. In considering the policies of the United States in foreign lending and the policies of the Fund and the Bank, particularly in conducting exchange transactions, the Council and the United States representatives on the Fund and the Bank shall give careful consideration to the progress which has been made in achieving such agreement and cooperation.

SEC. 15. [For text, see below.]

AMENDMENTS TO THE NATIONAL BANK ACT AND THE BRETTON WOODS AGREEMENTS ACT

(63 Stat. 298; 73 Stat. 299)

Paragraph Seven of section 8 of the National Bank Act, as amended (U.S.C., title 12, sec. 24) was amended by adding to the end thereof the following sentence: "The limitations and restrictions herein contained as to dealing in and underwriting investment securities shall not apply to obligations issued by the International Bank for Reconstruction and Development or the Inter-American Development Bank which are at the time eligible for purchase by a national bank for its own account: *Provided*, that no association shall hold obligations issued by either of said banks as a result of underwriting, dealing, or purchasing for its own account (and for this purpose obligations as to which it is under commitment shall be deemed to be held by it) in a total amount exceeding at any one time 10 per centum of its capital stock actually paid in and unimpaired and 10 per centum of its unimpaired surplus fund."

The Bretton Woods Agreements Act, as amended (U.S.C., title 22, secs. 286–286k), was amended by adding at the end thereof a new section to be numbered section 15 and to read as follows:

"SEC. 15. (a) Any securities issued by International Bank for Reconstruction and Development (including any guaranty by the bank, whether or not limited in scope), and any securities guaranteed by the bank as to both principal and interest, shall be deemed to be exempted securities within the meaning of paragraph (a) (2) of section 3 of the Act of May 27, 1933, as amended (U.S.C., title 15, sec. 77c), and paragraph (a) (12) of section 3 of the Act of June 6, 1934, as amended (U.S.C., title 15, sec. 78c). The bank shall file with the Securities and Exchange Commission such annual and other reports with regard to such securities as the Commission shall determine to be appropriate in view of the special character of the bank and its operations and necessary in the public interest or for the protection of investors.[2]

"(b) The reports of the National Advisory Council provided for in section 4 (a) (6)[3] of the Bretton Woods Agreements Act shall also cover and include the effectiveness of the provisions of section 15 (a) of this Act and the exemption for securities issued by the bank provided by section 8 of the National Bank Act in facilitating the operations of the bank and the extent to which the operations of the bank may assist in financing European recovery and the reconstruction and development of the economic resources of member countries of the bank and the recommendations of the Council as to any modifications it may deem desirable in the provisions of this Act."[4]

REPORTING REQUIREMENT OF CHAPTER 3 OF PUBLIC LAW 91–599 (84 STAT. 1658), APPROVED DECEMBER 30, 1970

SEC. 31. Annual Report

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[2] Substantially equivalent provisions regarding the securities issued by the Inter-American Development Bank in connection with the raising of funds for its ordinary capital resources were enacted in Public Law 86–147, section 11 (a); 22 USCA 283h (a).

[3] So in original. Probably should read "section 4 (b) (6)".

[4] Equivalent provisions with regard to the operations of the Inter-American Development Bank were enacted in Public Law 86–147, section 12; 22 USCA 283.

"The National Advisory Council on International Monetary and Financial Policies shall include in its annual report to the Congress (1) a statement with respect to each loan approved and outstanding, made by the International Bank for Reconstruction and Development, the International Development Association, the Inter-American Development Bank, and the Asian Development Bank, including an evaluation of new loans made by said organization and a progress report of the project covered by each loan, and a discussion of how each loan will benefit the people of the recipient country, and (2) a statement on steps taken jointly and individually by member countries of the Inter-American Development Bank to restrain their military expenditures, and to preserve and strengthen free and democratic institutions."

SUSPENSION OF RIGHT OF INTERNATIONAL BANK TO ISSUE SECURITIES UNDER SECTION 286k-1: REPORT OF SECURITIES AND EXCHANGE COMMISSION [22 U.S.C. 286k-2.]

SEC. 3. The Securities and Exchange Commission acting in consultation with the National Advisory Council on International Monetary and Financial Problems is authorized to suspend the provisions of section 15(a) of the Bretton Woods Agreements Act at any time as to any or all securities issued or guaranteed by the bank during the period of such suspension. The Commission shall include in its annual reports to Congress such information as it shall deem advisable with regard to the operations and effect of this Act and in connection therewith shall include any views submitted for such purpose by any association of dealers registered with the Commission.[5]

SECTION OF THE INTERNATIONAL FINANCE CORPORATION ACT RELATING TO THE NATIONAL ADVISORY COUNCIL

(69 Stat. 669; 22 U.S.C. 282b)

SEC. 4. The provisions of section 4 of the Bretton Woods Agreements Act, as amended (22 U.S.C. 286b), shall apply with respect to the Corporation to the same extent as with respect to the International Bank for Reconstruction and Development. Reports with respect to the Corporation under paragraphs 5 and 6 of subsection (b) of section 4 of said Act, as amended, shall be included in the first report made thereunder after the establishment of the Corporation and in each succeeding report.

SECTION OF THE INTER-AMERICAN DEVELOPMENT BANK ACT RELATING TO THE NATIONAL ADVISORY COUNCIL

(73 Stat. 299; 22 U.S.C. 283b)

SEC. 4. The provisions of section 4 of the Bretton Woods Agreements Act, as amended (22 U.S.C. 286b), shall apply with respect to the Bank to the same extent as with respect to the International Bank for Reconstruction and Development and the International Monetary Fund. Reports with respect to the Bank under paragraphs (5) and (6) of subsection (b) of section 4 of said Act, as amended, shall be included in the first report made thereunder after the establishment of the Bank and in each succeeding report.

SECTION OF THE INTERNATIONAL DEVELOPMENT ASSOCIATION ACT RELATING TO THE NATIONAL ADVISORY COUNCIL

(74 Stat. 293; 22 U.S.C. 284)

SEC. 4. The provisions of section 4 of the Bretton Woods Agreements Act, as amended (22 U.S.C. 286b), shall apply with respect to the Association to the same extent as with respect to the International Bank for Reconstruction and Development and the International Monetary Fund. Reports with respect to the Association under paragraphs (5) and (6) of subsection (b) of section 4 of said Act as amended, shall be included in the first report made thereunder after the establishment of the Association and in each succeeding report.

SECTION OF THE AFRICAN DEVELOPMENT FUND ACT RELATING TO THE NATIONAL ADVISORY COUNCIL

(90 Stat. 594; 22 U.S.C. 290g-3)

SEC. 204. The provisions of section 4 of the Bretton Woods Agreements Act, as amended (22 U.S.C. 286b), shall apply with respect to the Fund to the same extent as with respect to the International Bank for Reconstruction and

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[5] Equivalent provisions regarding securities issued by the Inter-American Development Bank were enacted in Public Law 86-147, section 11(b); 22 USCA 283h(b).

Development and the International Monetary Fund. Reports with respect to the Fund under paragraphs (5) and (6) of subsection 4 of said Act, as amended, shall be included in the first report made thereunder after the United States accepts participation in the Fund.

Ex. Ord. No. 10033. Regulations Governing the Providing of Statistical Information to Intergovernmental Organizations

Ex. Ord. No. 10033, Feb. 8, 1949, 14 F.R. 561, as amended by Ex. Ord. No. 11269, Feb. 14, 1966, 31 F.R. 2813, provides:

Sec. 1. Except as provided in section 2 hereof, the Director of the Bureau of the Budget, hereinafter referred to as the Director, (a) shall determine, with the concurrence of the Secretary of State, what statistical information shall be provided in response to official requests received by the United States Government from any intergovernmental organization of which this country is a member, and (b) shall determine which Federal executive agency or agencies shall prepare the statistical information thus to be provided. The statistical information so prepared shall be transmitted to the requesting intergovernmental organization through established channels by the Secretary of State or by any Federal executive agency now or hereinafter authorized by the Secretary of State to transmit such information.

Sec. 2. (a) The National Advisory Council on International Monetary and Financial Policies, hereinafter referred to as the National Advisory Council, shall determine, after consultation with the Director, what information is essential in order that the United States Government may comply with official requests for information received from the International Monetary Fund or the International Bank for Reconstruction and Development.

(b) The Director shall determine which Federal executive agency or agencies shall collect or make available information found essential under section 2(a) hereof.

(c) In the collection of information pursuant to a determination made by the Director under section 2(b) hereof in response to a request under article VIII, section 5, of the Articles of Agreement of the International Monetary Fund, the authority conferred on the President by section 8 of the Bretton Woods Agreements Act to require any person to furnish such information, by subpoena or otherwise, may be exercised by each of the following-named agencies:

Department of Agriculture.
Department of Commerce.
Department of the Interior.
Department of Labor.
Department of the Treasury.
Board of Governors of the Federal Reserve System.
Federal Communications Commission.
Federal Deposit Insurance Corporation.
Federal Power Commission.
Federal Trade Commission.
Interstate Commerce Commission.
Securities and Exchange Commission.
United States Maritime Commission.
United States Tariff Commission.

(d) The information collected or made available under section 2 of this order shall be submitted to the National Advisory Council for review and for presentation to the said Fund or Bank.

(e) As used in this order, the word "person" means an individual, partnership, corporation, or association.

Sec. 3. The Director's determination of any matter under section 1 or section 2(b) of this order shall be made after consulting appropriate Federal executive agencies and giving due consideration to any responsibility now exercised by any of them in relation to an intergovernmental organization.

Sec. 4. This order shall not be construed to authorize the Director or the National Advisory Council to provide, or to require any Federal executive agency to provide, to an intergovernmental organization (a) information during any period of time when the agency having primary responsibility for security of the specified information declares that it must be withheld from the intergovernmental organization in the interest of military security, or (b) information which any Federal executive agency is required by law to maintain on a confidential basis.

Sec. 5. The Director and the National Advisory Council are authorized to prescribe such regulations as may be necessary to carry out

their respective responsibilities under this order.

SEC. 6. To the extent that this order conflicts with any previous Executive order, the provisions of this order shall control.

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APPENDIX B

LATIN AMERICAN DEFENSE EXPENDITURES

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APPENDIX B

LATIN AMERICAN DEFENSE EXPENDITURES

Introduction

This portion of the National Advisory Council's Annual Report deals with Latin American defense expenditures, a subject which continues to be of concern to the U.S. Congress. This section of the Report assesses the impact of defense-related spending on the region as a whole and on the capacities of selected countries to support and absorb such expenditures.

The Appendix reviews historical trends in Latin American military spending, identifies the periods of major emphasis on military-related expenditures, examines the role of the United States and other supplier nations, discusses some of the factors that tend to obscure the impact of such spending and concludes with a discussion of major trends and prospects for the future.

Historical Background

To understand properly the relative magnitude and significance of Latin American military spending, it is essential to view it against the background of recent history. Only then can the extremely modest nature of regional arms spending be fully comprehended and deviations from historic norms correctly interpreted.

For a variety of political and historic reasons, Latin American nations traditionally purchased their armaments from a wide spectrum of suppliers, primarily European. During the 1920's and 1930's, South American countries bought very little military equipment from the United States. For a combination of reasons—a generally restrictive arms transfer policy, and a lack of sufficient equipment to satisfy Latin desires for armaments—the United States played only a minor role. There were, however, several notable exceptions. In the 1920's Peru purchased four submarines and in the late 1930's, Argentina, Bolivia and Chile acquired some military aircraft. The dollar value of all these purchases ran about $30–40 million.

By early 1941, however, with war spreading across Europe, Latin America was included in the Lend-Lease Program as President Roosevelt certified that the defense of Latin America was vital to the defense of the United States. Agreements were negotiated with 18 Latin American nations under this program.

With the entry of the United States into the war and the resultant enforced isolation of the Hemisphere, the United States became virtually the sole source of supply of armaments for Latin America. By 1945, some $324 million worth of equipment had been provided to the Latin American region, primarily to Brazil, which was outfitting an expeditionary force destined for combat in Italy in 1944. The experiences of the war years helped establish the United States as the single largest supplier of military equipment to the region through a series of sales, grant and loan programs, a role that went unchallenged for nearly two decades.

It is interesting to note and germane to this report that as early as 1945, the United States had already expressed its concern over the economic impact such continued military assistance might have on the nations of Latin America. Further, restrictions were placed on provision of such aid if there was reason to believe that recipient nations would use their newly acquired weaponry to wage war upon each other, or if they were to be used to suppress internal dissent. All three factors have continued to be fundamental to United States military assistance policies and programs during the three decades since.

European suppliers were not idle during the post-war years and their large surpluses of combat equipment, primarily ships, tanks and aircraft, found ready customers among the Latin American nations. With the Cold War in Europe, official attention had swung away from the Hemisphere, and the Mutual Defense Assistance Act of 1949 did not include Latin America among its beneficiaries. By then, however, Great Britain had sold the first 100 Meteor jet fighters to Argentina and orders were subsequently placed in Europe for 13 major naval combatant vessels.

Immediately following World War II, from the late forties until about 1955, Argentina, Peru and Venezuela, to name the principal purchasers, bought aircraft—light bombers and jet fighters—from a variety of European suppliers. During the second identifiable period, the navies of Latin America tended to be the beneficiaries of European arms buying as Argentina and Brazil bought the first aircraft carriers in the Hemisphere south of the Rio Grande; Chile bought guided missile frigates from Great Britain; Colombia ordered Swedish destroyers while Peru purchased surplus British guided missiles and destroyers and Venezuela bought nine destroyers and destroyer escorts from the UK and Italy respectively.

The third and current phase of Latin American military expenditures began in the mid-sixties when both navies and air forces of the Hemisphere felt themselves under growing pressures to upgrade their inventories and modernize their equipment. Combat aircraft tended to dominate the early years of this purchasing period with Argentina, Brazil, Colombia, Peru and Venezuela all buying French Mirage aircraft. Armor and artillery were also bought during this period and in 1973 Peru received the first of several hundred tanks from the Soviet Union, adding yet another dimension to Latin American arms spending.

But by 1951 and passage of the Mutual Security Act, the United States had formally entered into military assistance agreements with the nations of Latin America. Ecuador was the first to sign in 1952 and by 1955 11 nations had mutual security agreements with the United States.

By the mid-to-late 1960's, however, the six major South American countries had once again turned to Europe, their traditional supplier of armaments. During the 1967–72 period, Argentina, Brazil, Chile, Colombia, Peru and Venezuela accounted for 97 percent of all military equipment orders placed by Latin American nations with 75 percent of those orders placed in Western Europe, primarily the United Kingdom, France and Western Germany. In contrast, the United States received only 13 percent of Latin defense orders during the same time frame while Canada accounted for 10 percent of the market and Australia 2 percent. For the Latin American region as a whole, the United States provided about 30 percent and European suppliers about 70 percent of all military equipment and supplies purchased during this period.

Several significant factors accounted for this shift, not the least of which was European willingness to introduce new, advanced weapons systems such as the supersonic Mirage fighter aircraft as well as a wide variety of tactical missile systems. Extremely favorable, if not concessionary financing terms offered by European suppliers when contrasted with restrictive legislation and political and economic constraints on the United States ability to respond to Latin American arms requests accelerated the trend towards the European supplier nations. No less important a factor was the growing trend in Latin America towards asserting greater independence from the United States, manifesting itself by a desire to diversify their sources of arms supply.

Generally speaking, European sales of military equipment in Latin America reached a peak in 1970 reflecting not only increased availability of equipment but also concerted regional efforts at modernization and replacement of aging equipment, particularly combat aircraft and naval vessels. Sharply higher unit costs of new production items and increased sophistication combined with inflationary factors, drove Latin American military spending to a level five times that of the previously recorded peak during the 1950's.

Recent Trends

Although Latin American spending for military equipment and related goods and services peaked in the late 1960's and early 1970's, the region as a whole spent slightly more on defense in 1973 and 1974 than it did during the previous 4 years. By 1975, however, arms sales to Latin America by some 27 supplier nations reached a record high, something in excess of $1 billion or twice the previous annual average of about $500 million. For the 1970–75 period, more than half the major purchases were for the navies, principally Argentina and Venezuela with the balance going for aircraft and tanks.

Six countries—Argentina, Brazil, Chile, Ecuador, Peru and Venezuela—accounted for over 85 percent of the total of nearly four billion dollars worth of armaments during the 1970–75 time frame. Of this total, almost three quarters came from the principal West European suppliers. It is interesting to note that the United States now ranks behind the Soviet Union, Great Britain, West Germany and Italy in arms sales to Latin America. Israel, a relative newcomer to the Latin arms market, may soon move the United States to sixth rank among supplier nations to the Hemisphere.

The European share of the Latin American military market dropped sharply during the 1973–74 period, from the highs of the late 1960's to about 40 percent of the regional total while the United States increased its share of total sales of military equipment to Latin America from less than 10 percent to over 40 percent in the same period. This very substantial increase in U.S. sales stemmed primarily from aircraft orders involving major purchases or commitments by Brazil and Chile for the F-5E fighter and the A-37B light attack aircraft. At the same time, however, others, including Argentina, Colombia and Venezuela, reduced their expenditures for military materiel—one of the contributing factors being the drastic changes in the world petroleum market. A dual effect occurred in Latin American arms spending directly attributable to the world price of oil: some oil consuming nations were forced to alter or curtail their defense spending patterns while others, such as Ecuador, were able to exploit their new found affluence in the world arms market.

Despite the large relative increase in Latin American military spending since 1967, little in the way of major new equipment or weapons systems has appeared in the area, notable exceptions being the Mirage fighter ordered first by Peru and subsequently by Argentina, Brazil, Colombia, and Venezuela; French AMX-13 and AMX-30 tanks; and Soviet T-54/55 tanks in Peru together with other equipment including missile systems and some new naval combatants including 1,000-ton coastal submarines ordered from West Germany. Most of the recent major acquisitions continue, however, to be concentrated on equipment for air and naval forces which, for the most part, are still characterized by Korean War vintage aircraft and World War II era ships. Latin American ground forces have felt the impact of new equipment deliveries the least, although there is a trend toward replacing aging tanks, some predating World War II, with new light and medium tanks and armored personnel carriers.

A factor that continues to influence Latin American countries is their pattern of widespread purchasing from a diversity of suppliers. This practice has created pressures to replace the multiplicity of weapons systems as logistical capabilities prove inadequate to support such a variety of obsolescent equipment. Despite these pressures and the lessons of history, Latin nations are again demonstrating a reluctance to depend upon any nation as the sole supplier of military equipment and related assistance. Consequently, new acquisitions will continue to reflect the historical pattern of diversity with concomitant maintenance, training and standardization problems.

Compelling reasons of force modernization and replacement of aging and unsupportable equipment continue to be the dominant motivating factors behind Latin American military spending. Despite large infusions of new equipment, the majority of Latin American military materiel dates from World War II and in some cases even earlier. All of the Latin armed services—but particularly the six major South American nations with the most highly professionalized military establishments—understandably feel keenly their inability to function with obsolete equipment with the attendant impact on service morale and national concepts of sovereignty.

Economic Impact

Military purchases, even of the magnitudes recorded during the peak years of 1967–72 and more recently in 1976 do not appear to have constituted a relatively heavy economic burden to the nations of Latin America. In most instances, military spending is but a small fraction of the national budget. Steadily improving economic growth has enabled many countries to spend more for modernization and upgrading of their armed forces while at the same time increasing civilian consumption and investment levels. Furthermore, the impact of purchases from European suppliers (and in the case of Peru, purchases from the Soviet Union) is further diluted by liberal, if not outright concessionary, credit terms which spread the payments out over a number of years, often coupled with an initial grace period and very low interest rates.

Another factor that tends to blur the fundamental nature of Latin American military expenditures is inclusion of personnel costs, i.e., pay, allowances, housing, medical, retirement and other non-materiel expenses. In many instances, defense funds are also earmarked for civic action type activities in support of the nation-building role of many of the armed forces of the region. Thus, net amounts spent on equipment tend to remain relatively low, and in recent years, only Peru (beginning in 1967) has exceeded significantly the regional norm, reflecting the high cost per unit of such equipment as the Mirage fighters and the AMX tanks. Even large scale acquisitions from the Soviet Union have not influenced substantially the ratio of military expenditures to GNP, largely for the mitigating factors enumerated earlier.

Despite the apparent large increase in absolute terms, military outlays for the Latin American region as a whole averaged only 2.3 percent of GNP for the last decade, a period which included the peak buying years, a norm which is not appreciably greater than for the previous decade. Measured against that standard, Colombia averaged the least at 1.4 percent of GNP while Peru significantly exceeded the norm with a 10-year average of 3.4 percent, reaching 4.8 percent of GNP in 1975. Even though regional spending for armaments and related services has quadrupled since 1940, it is interesting to note that the overall historic trend of Latin American military expenditures continues to demonstrate the same basic pattern it has for over 30 years—namely substantially less than 3 percent of gross national product expended on military related purchases—the lowest level of such spending in the world today except for some sub-Saharan African nations. Much of this fourfold increase in military expenditures is attributable in large part to steadily rising personnel and other fixed costs as well as increased unit costs of equipment, a result not only of more advanced designs but of inflationary factors as well. To express the modest nature of Latin spending another way, an example might serve to establish perspective. In 1973, the combined arms spending of all 23 nations of Latin America totaled $476 million. A year later a *single* order from Saudi Arabia ran $588 million.

Prospects

In spite of what would appear to be heavy emphasis on replacement of equipment, the military establishments of Latin America still possess sizable inventories of aging and obsolescent equipment. Hopelessly outdated and often impossible to maintain, this equipment will need to be replaced or at a minimum rehabilitated over time. Often it proves far more cost effective to simply replace these units with new production whose higher costs are somewhat offset by savings realized in reducing the logistical problems inherent in older equipment. But efforts at modernization whether through upgrading of present inventories or through complete replacement will be extremely costly. Inexpensive surplus U.S. equipment is no longer available and new production from whatever source is very expensive. Advanced technology, increased raw material costs, and inflation have combined to send prices of new armaments skyrocketing.

In spite of persistent pressure to renew or replace outdated equipment, and indeed, in the case of oil producing countries, a new found capability to acquire modern weaponry, the institutional needs of the major armed forces of the Hemisphere are still rather modest and once met should remain generally stable for the balance of the decade although substantially above the levels of the late 1960's. Whether they will again reach the highs of 1975 is problematical. Although the likelihood of overt external threat in Latin America is minimal and should not of itself be a major factor leading to any sudden departure from the norm, Latin American perceptions of and reactions to the recent Cuban involvement in Angola have produced a measure of very real concern. These concerns could translate into increased demands for purchasing defensive armaments. These, however, could be limited by the fact that concessionary credit terms probably will not be so readily available from European suppliers as they have been heretofore, especially as new and more lucrative markets have opened up in the oil rich regions of the world.

A combination of new found wealth coupled with the perceived threat of Cuban adventurism could generate pressures for renewed spending for upgrading and expanding military establishments. There has been, and will continue to be, no shortage of suppliers willing to meet such demands, even if not on so concessionary a basis as in years past. Such a move toward increasing military expenditures could, in turn, create regional pressures that individual countries might find hard to withstand. Taken as a whole, however, Latin America appears to be generally following its historic arms expenditure pattern and although there may be periodic aberrations, even including another peak as high as 1975, should continue to do so for the balance of the decade.

DEFENSE EXPENDITURES AS A PERCENT OF GROSS NATIONAL PRODUCT, 1976

Argentina	2.0
Brazil	1.4
Chile	4.0
Colombia	1.6
Ecuador	2.2
Peru	3.4
Venezuela	1.2
Average	2.6
Ten-year average	2.3

NOTE.—The text of this appendix to the Council's Annual Report for 1977 was supplied by the Department of State.

APPENDIX C

LOANS BY THE INTERNATIONAL DEVELOPMENT LENDING INSTITUTIONS DURING THE PERIOD JULY 1, 1976 TO JUNE 30, 1977

NAC Procedures

During the twelve month period ending June 30, 1977, the international development lending institutions—the International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA), the Inter-American Development Bank (IDB), the Asian Development Bank (ADB) and the African Development Fund (AFDF)—authorized economic development loans and credits totaling $8.9 billion equivalent in 83 countries. A breakdown of this amount, by country and by institution, is presented in Table C–1 below.

Detailed documentation on each international development lending institution (IDLI) loan proposal is prepared by the management of the respective institution and is made available to NAC member and participating agencies for review in accordance with agreed U.S. Government procedures and policies. Appendix C of the NAC Annual Report for Fiscal Year 1973 (H. Doc. 93–198) contained a summary of these agreed procedures and policies.

The outcome of NAC review of IDLI loan proposals is an NAC "Action" document advising the Secretary of the Treasury as to the Council's recommended instructions to the U.S. representatives to the IDLIs on the positions to be adopted on behalf of the United States at the Board meetings during which the loan proposals are to be discussed. It should be noted that the NAC has, on occasion, recommended—and the Secretary of the Treasury has so instructed—that the U.S. representative abstain in the vote, or cast a negative vote, on some proposals of the IDLIs. A tabulation of such recent "abstention" and "no" votes is presented in Table C–2 below.

Loan Descriptions

This Appendix of the NAC Annual Report also provides a brief description of each development loan approved by the Boards of the international development lending institutions for the period covered. For reader convenience, the loan descriptions are arranged alphabetically by recipient country and by institution. Basic data on the purpose, amount, terms, borrower identity, economic or financial rates of return and approval date of each loan are given. There is also a brief survey of significant economic or social factors relevant to the decision to make the loan and the beneficial impact the loan is expected to have on the people of the borrowing country.

Some IDLI loans and credits help finance projects which have direct, quantifiable benefits which can be estimated in terms of such factors as the numbers of people or families benefited, the number of new water connections made or the number of new places created in schools for students. Estimates of these benefits are provided in the loan descriptions as feasible. In other cases, the nature of the projects being financed (e.g., highways or power plants) may be such that the benefits are widely distributed throughout a country. The loan descriptions in these cases recapitulate the expected general economic effects and the benefits to individuals are considered as implicit, including such aspects as wider employment opportunities, improved health standards and the availability of resources for capital investments.

Loans involving the creation of physical facilities also frequently have direct short-term benefits in the form of new jobs during the construction phase of a project. This is often an important catalytic element in sustaining employment and income, particularly in some of the smaller developing countries.

The statistical data and narrative materials on development loans and credits in this appendix do not include the operations of the International Finance Corporation (IFC), loans made by the IDLIs to finance short- and medium-term export credit programs, loans and credits authorized to supplement resources of previous transactions to meet such needs as cost overruns, and previous loans and credits which were reformulated or restructured during the period under review without any significant changes in the original terms or amounts.

TABLE C-1.—*Economic development loans authorized by international development lending institutions, by area, July 1, 1976 to June 30, 1977*

[$ million equivalent]

Area, country	IBRD	IDA	IDB	ADB	AFDF	Total
Eastern Africa:						
Botswana	20.0					20.0
Burundi		10.0			5.0	15.0
Ethiopia		57.0			5.5	62.5
Kenya	115.0	40.0				155.0
Lesotho		2.5			6.3	8.8
Madagascar		14.0			4.1	18.1
Malawi	17.0	15.0			11.0	43.0
Mauritius	3.6					3.6
Mozambique					8.8	8.8
Rwanda		19.8			13.7	33.5
Somalia		12.0			7.2	19.2
Sudan	12.0	25.0				37.0
Swaziland	9.0					9.0
Tanzania	75.0	39.2			14.3	128.5
Zaire		26.0				26.0
Zambia	60.1					60.1
Totals	311.7	260.5			75.9	648.1
Western Africa:						
Benin		7.2			5.5	12.7
Cameroon	40.0	23.5				63.5
Chad		20.0			4.7	24.7
Congo	8.0	0.5				8.5
Ghana	48.0	9.0				57.0
Guinea-Bisseau					4.4	4.4
Ivory Coast	64.0					64.0
Liberia	13.3	7.0				20.3
Mali		26.0			10.6	36.6
Mauritania		6.2			1.0	7.2
Nigeria	62.0					62.0
Senegal	23.8					23.8
Sierra Leone					5.5	5.5
Togo		10.0				10.0
Upper Volta		23.6			5.5	29.1
Totals	259.1	133.0			37.2	429.3

TABLE C-1.—*Economic development loans authorized by international development lending institutions, by area, July 1, 1976 to June 30, 1977*—Continued

[$ million equivalent]

Area, country	IBRD	IDA	IDB	ADB	AFDF	Total
East Asia & Pacific:						
Burma		26.0		25.1		51.1
Gilbert Islands				1.8		1.8
Hong Kong				20.5		20.5
Indonesia	440.0			49.7		489.7
Korea	443.5			62.0		505.5
Malaysia	131.0			52.0		183.0
Papua New Guinea	12.0	23.0		21.2		56.2
Philippines	317.5			67.0		384.5
Solomon Islands				3.6		3.6
Thailand	108.0					108.0
Western Samoa				3.0		3.0
Totals	1,452.0	49.0		305.9		1,806.9
South Asia:						
Afghanistan		18.0		14.0		32.0
Bangladesh		122.0		68.5		190.5
India	269.0	481.0				750.0
Nepal		28.0		50.3		78.3
Pakistan	125.0	80.0		48.6		253.6
Sri Lanka		33.2		5.0		38.2
Totals	394.0	762.2		186.4		1,342.6
Europe, Middle East & North Africa:						
Algeria	170.0					170.0
Cyprus	10.0					10.0
Egypt	215.5	52.0				267.5
Greece	71.0					71.0
Morocco	166.0					166.0
Oman	16.5					16.5
Portugal	74.0					74.0
Romania	166.3					166.3
Spain	18.0					18.0
Syria	67.5					67.5
Tunisia	89.5	4.8				94.3
Turkey	170.0					170.0
Yemen AR		21.0				21.0
Yugoslavia	240.0					240.0
Totals	1,474.3	77.8				1,552.1
Mexico, Central America & Caribbean:						
Bahamas	10.0					10.0
Barbados			7.4			7.4
Costa Rica	18.0		38.4			56.4
Dominican Republic	10.0		23.4			33.4
El Salvador	6.7	6.0	20.0			32.7
Guatemala	81.5		25.0			106.5
Haiti		10.0	5.0			15.0
Honduras	47.0	5.0	115.0			167.0
Jamaica	15.0		10.6			25.6
Mexico	257.0		89.0			346.0
Nicaragua	22.0		49.8			71.8
Panama	57.5		51.0			108.5
Totals	524.7	21.0	434.6			980.3

TABLE C–1.—*Economic development loans authorized by international development lending institutions, by area, July 1, 1976 to June 30, 1977*—Continued

[$ million equivalent]

Area, country	IBRD	IDA	IDB	ADB	AFDF	Total
South America:						
Argentina	320.0		230.0			550.0
Bolivia	98.5		11.5			110.0
Brazil	425.0		224.1			649.1
Chile	60.0		68.0			128.0
Colombia	281.0		109.0			390.0
Ecuador	59.0		57.6			116.6
Paraguay	40.0	4.0	11.6			55.6
Peru	60.0		77.1			137.1
Uruguay			15.0			15.0
Regional			8.0			8.0
Totals	1,343.5	4.0	811.9			2,159.4
Net totals	5,759.3	1,307.5	1,246.5	492.3	113.1	8,918.7

TABLE C–2.—*"No" Votes and "Abstentions" by the United States in the International Development Lending Institutions*

[*July 1, 1976—June 30, 1977*]

Institution	Date	Borrower	Amount ($ millions equivalent)	Project	Vote	Reason
IBRD	December 1976	Congo, People's Republic	8.0	Education	No	Expropriation
	June 1977	Argentina	100.0	Industrial Credit	Abstain	Human Rights
IDA	September 1976	Tanzania	8.0	Tobacco	Abstain	Inefficient use of resources
	February 1977	India	30.0	Agriculture	No	Long Amendment *
	March 1977	India	150.0	Power	No	Long Amendment *
	March 1977	India	24.0	Madras Urban Development	No	Long Amendment *
	March 1977	India	12.0	Agricultural Extension	No	Long Amendment *
	March 1977	India	4.0	Fisheries	No	Long Amendment *
	May 1977	India	200.0	Agricultural Finance Corp.	No	Long Amendment *
	May 1977	India	10.0	Agricultural Research & Extension	No	Long Amendment *
	May 1977	Ethiopia	25.0	Irrigation	Abstain	Human Rights
	May 1977	Ethiopia	32.0	Roads Project	Abstain	Human Rights
	May 1977	Benin	5.5	Roads Project	Abstain	Human Rights
	May 1977	Benin	1.7	Regional Development (T.A.)	Abstain	Human Rights
	June 1977	India	23.0	Irrigation	No	Long Amendment *
	June 1977	India	8.0	Agricultural Development Project	No	Long Amendment *
ADB	September 1976	Nepal	4.8	Roads	Abstain	Cost Overrun

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*P.L. 93–373 requires the United States Governor in IDA to vote against any utilization of IDA funds for the benefit of any country which develops any nuclear explosive device, unless the country is or becomes a State Party to the Treaty on the Non-Proliferation of Nuclear Weapons.

WORLD BANK

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

AFGHANISTAN

EDUCATION: The project this IDA credit will help finance is designed to meet the urgent need for middle-level extension agents in Afghanistan's agricultural sector and the introduction of a more practical curriculum and field training facilities in Afghanistan. It will also help correct urban/rural schooling imbalances by providing additional secondary agricultural school facilities in rural areas. Specific components of the project include construction, furnishing and equipping four new agricultural secondary schools, expanding, furnishing and equipping three existing agricultural secondary schools, and the development of preinvestment designs for a national education materials and service center, a national teacher training complex, five regional teacher training institutes, and related technical assistance.

Borrower: Republic of Afghanistan.

Terms: $6.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $11.5 million equivalent.

Purpose & Benefits: The major benefits from this project are expected to be as follows: (a) graduates from project schools will meet some of the urgent middle-level manpower requirements of the Ministry of Agriculture, the Rural Development Department of the Office of the President, other agricultural organizations and the Ministry of Education. This is vital for the achievement of the targets in the new Seven Year National Development Plan for the agricultural sector; (b) more practical agricultural training, including exposure to local non-formal education, extension staff training programs and village development activities, is to be introduced; (c) systematic training of agricultural teachers will be developed, and agricultural training opportunities will become more generally available in rural areas. The most serious risk in the project is whether enough competent agricultural teachers can be trained in timely fashion, since the viability of the project will depend heavily on success in recruiting agricultural teachers.

Date Approved: December 23, 1976 (IDA)

AGRICULTURE: This project will help stimulate agricultural production, productivity and farm incomes by providing credits for investments and modern inputs and improving the existing low levels of farm management and technology in Afghanistan. The project emphasizes assistance to smallholders, cooperatives, groups of small farmers and the settlement of previously landless persons. The project involves a three-year lending program of the Agricultural Development Bank of Afghanistan (AgBank) comprising farm mechanization, irrigation wells, on-farm development, land settlement for 4,000 new settlers, fertilizer and other inputs, marketing and processing, and AgBank supporting services.

Borrower: Republic of Afghanistan.

Terms: $12.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $31.5 million equivalent.

Purpose & Benefits: This project will directly benefit more than 60,000 farmer sub-borrowers and their families (a total of about 430,000 persons). Of these 60,000 farm families, approximately 50,000 will be smallholders (less than five ha. of land each), nearly half of whom are in a target group having average annual family incomes of about $450 equivalent. The absolute poverty level in Afghanistan is currently estimated at about $512 equivalent annual income per family. The financial rate of return on investment in tractors will be 42 percent, for deep and shallow well pumps about 15 percent, on land settlement 16 percent, fertilizer 54 percent and vineyard development 11 percent. The project is also expected to generate increased production of about 50 percent in wheat, 14 percent in corn, and 140 percent in seed cotton and sugarbeets. The expected greater availability of products for export will increase foreign exchange earnings by about $45 million equivalent per annum. The project's economic rate of return is estimated at about 100 percent for fertilizer and other inputs, 21.2 percent for land settlement, 30.4 percent and 23.6 percent for shallow and deep well pumps, respectively, 50 percent for tractors and a minimum of 17.7 percent for on-farm development. The average economic rate of return is just over 46 percent, based on total project costs.

Date Approved: June 2, 1977 (IDA)

ALGERIA

EDUCATION: This project consists of the architectural design, construction, furniture and equipment for 15 technicums (an upper secondary middle-level technical training institution) and two Vocational Training Centers. Technical assistance for two preinvestment studies and for training technicum staff will also be included in the project.

Borrower: Democratic and Popular Republic of Algeria.

Terms: $48.5 million equivalent World Bank loan. Term of 17 years with interest at 8.5 percent per annum. Total project cost: $111.9 million equivalent.

Purpose & Benefits: By helping to provide an annual output of 4,500 middle-level technicians and 480 skilled craftsmen, this project will contribute significantly to meeting urgent Algerian manpower needs in the mechanical, electrical, construction and chemical industries, and in commerce. It is thus supportive of the Government's policies for rapid industrialization, diversification and technological progress. It will also help local indus-

ALGERIA—Continued

trial development efforts by decentralizing skilled training opportunities and by reducing regional inequalities. The establishment of the fifteen technicums under the project will require a considerable number of workshop instructors, skills which are in scarce supply in Algeria. To meet this problem, steps will be taken under the project to ensure an adequate teacher training program.

Date Approved: March 15, 1977 (IBRD)

TRANSPORTATION: This project involves the construction of the Boudouaou-Lakhdaria road (40 km.) plus the provision of consulting services for the Ministry of Public Works and Construction and training for its staff.

Borrower: Democratic and Popular Republic of Algeria.

Terms: $41.5 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $101.6 million equivalent.

Purpose & Benefits: Construction of this road will reduce vehicle operating costs, trip time and accidents between the two cities. In addition, the new road will alleviate serious congestion problems; facilitate the transportation of industrial products, processed agricultural commodities, bottled beverages and fuels; and encourage industrial development in the road's zone of influence. Most of the benefits from the road construction will accrue, in the first instance, to the State-owned trucking and bus companies, and to State industrial enterprises in other sectors of the economy. Since the tariffs of State trucking and bus companies are functions of distance, vehicle operating costs and journey times, it is expected that benefits from reduced vehicle operating costs will gradually accrue to the users of road transportation services. The benefits from road construction (88.3 percent of project costs) are estimated to yield a 20 percent economic rate of return. Sensitivity analyses indicate that the economic rate of return is still acceptable under assumptions of a 25 percent investment cost increase, a reduction of 25 percent in total benefits, and a 10 percent investment cost increase combined with a 10 percent reduction in total benefits. Benefits from consulting services and training cannot be quantified but these activities are expected to improve project preparation and execution, road maintenance and the organizational efficiency of the MPWC.

Date Approved: April 21, 1977 (IBRD)

TRANSPORTATION: This project for building a new port at Jijel comprises several elements: (a) construction of breakwaters, berths, transit sheds and supporting facilities; dredging and land reclamation, and the paving of roads and storage areas; (b) procurement of cargo handling and port construction equipment; and (c) consultants' services for project design, the preparation of bid documents, construction supervision, technical assistance for improving port planning, management, administration and operations, and training, and for studies and preparation of a new port accounting system and tariff structure.

Borrower: Democratic and Popular Republic of Algeria.

Terms: $80.0 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $352.4 million equivalent.

Purpose & Benefits: The location of this port reflects the Algerian Government's decision to build a steel complex in this economically underdeveloped area. The port will also serve to relieve port capacity shortages in eastern Algeria. In determining the location of the port, several other locations were studied and different port layout concepts and alternative designs analyzed. The project was, however, found to be the least-cost solution, its particular advantages including the availability of deep water, the presence of sand which can be removed by normal dredging, and an appropriate nearby area for building the steel complex. In an effort to overcome problems due to limited transport infrastructure, the Government is taking steps to improve local transportation systems. An economic evaluation of the project was carried out on three bases: first, by examining the steel complex plus the whole port complex; second, an examination of the steel complex and only those portions of the port related to handling its raw materials and products; and third, an examination of only those portions of the port related to general cargo traffic. In the first two cases, the economic rate of return was found to be about 12.3 percent and 10.4 percent, respectively, and, in the third case, 27.0 percent.

Date Approved: May 19, 1977 (IBRD)

ARGENTINA

POWER: This loan will assist in financing the principal elements of Servicios Electricos del Gran Buenos Aires S.A. (SEGBA) investments in transmission lines, substations and distribution facilities in the Greater Buenos Aires region for the period 1977 to 1981. The preparation of a national power expansion plan and a national power sector organization study, both to be carried out by the Government, also forms part of the project.

Borrower: Servicios Electricos del Gran Buenos Aires S.A. (SEGBA). *Guarantor:* Argentina.

Terms: $115.0 million equivalent. Term of 15 years with interest at 8.9 percent per annum. Total project cost: $495.3 million equivalent.

Purpose & Benefits: This loan will assist the Argentine Government in streamlining power sector organization, regulation, planning, financing and operation; and in formulating a national power expansion plan based on the least-cost alternative program for expanding generation and transmission facilities. The power plan is to incorporate reasonable criteria for establishing system reserves and will be designed to bring about the most rational use of indigenous energy resources, including coal, uranium, and hydroelectricity. With regard to SEGBA itself, the project will help provide the transmission facilities necessary to permit use of the energy to be generated by the hydropower plants at El Chocon, Planicie Banderita and Salto Grande and by the nuclear power station at Atucha. Availability of this energy is expected to enable SEGBA to meet increasing power demand stemming from the anticipated revitalization of industrial activity in Argentina in response to the new economic policies being implemented by the Government. Industrial sector growth has been the main cause of increased electricity consumption in Argentina (56 percent of the total over the last five years) and the project will provide the facilities necessary to support the continuation of this growth. The project will also provide necessary distribution facilities (65,000 new consumers are expected to be connected annually), reduce losses and improve the efficiency of SEGBA's operation and the reliability of its services. The benefits from this project, as a proxy, are assumed to be the price of electricity paid by the consumer. Project costs consist of investment and operating costs and the costs of bulk power and fuel purchased by SEGBA. Based on these factors, the economic rate of return for the project is estimated at about 21 percent.

Date Approved: September 21, 1976 (IBRD)

TRANSPORTATION: The proceeds of this loan will help finance a project comprising: (a) paving and improving fourteen earth or gravel roads (925 km.), repaving and improving four paved roads (390 km.) and upgrading two roads to four-lane highways (36 km.); (b) preparation of regional studies for agricultural development in Northern Argentina; (c) preparation of a National Transport Plan; and, (d) preparation of a Pavement Overlay Study and a Traffic Safety Program.

Borrower: The Argentine Republic.

Terms: $105.0 million equivalent World Bank loan. Term of 15 years with interest at 8.5 percent per annum. Total project cost: $345.1 million equivalent.

Purpose & Benefits: The economic evaluation of the Argentine Road Betterment Program takes into consideration the anticipated costs of civil works and the benefits expected to be derived from savings in vehicle operating costs, savings in time and savings in maintenance costs. Traffic counts on the project roads undertaken by the National Highway Authority in 1976 indicate weighted annual increases in normal traffic ranging from 3.5 percent to 9.0 percent. The average economic rate of return for the Road Betterment Program is estimated at 23 percent (with a first year benefit of 22 percent). Individual road segments under the program will have economic rates of return ranging from 16 percent to 53 percent.

Date Approved: March 22, 1977 (IBRD)

INDUSTRY: This World Bank loan will help finance the foreign exchange costs of fixed assets for investment sub-projects in the Argentine manufacturing sector and technical assistance to the Banco Nacional de Desarrollo (BANADE).

Borrower: Banco Nacional de Desarrollo (BANADE).
Guarantor: The Argentine Republic.

Terms: $100.0 million equivalent World Bank loan. Maximum term of 15 years with interest at 8.2 percent per annum.

Purpose & Benefits: During recent years, many industrial firms in Argentina postponed expansion plans and also tended to neglect necessary investments for reequipment in light of prevailing economic and political instability. As a consequence, a substantial proportion of the equipment and machinery in the industrial sector has become obsolete. The Argentine Government is taking energetic steps to stimulate priority investments and the industrial sector has responded positively and stepped up plans for modernization and expansion investment. This loan to BANADE complements policy measures already taken, and will help provide resources to finance the foreign exchange component of fixed assets associated with specific industrial sub-projects. The World Bank loan will also help accomplish the following objectives: (a) increasing the overall efficiency of the industrial sector by helping finance projects with the greatest potential for exports and import substitution; (b) supporting the design and implementation of reforms instituted by BANADE management aimed at rationalizing resource allocation in the industrial sector; (c) providing BANADE with technical assistance to improve its lending program in the industrial sector; and (d) serving as a catalyst for the mobilization of complementary external funds from international capital markets through co-financing arrangements.

Date Approved: June 16, 1977 (IBRD)

BAHAMAS

WATER SUPPLY & SEWERAGE: The principal components of this project are the expansion of the Bahamas water supply through a conservation program, importation of water from well-fields on Andros Island, the rehabilitation of the existing flash distillation plant at Blue Hills, and improvement of the water distribution, storage and well-field operation systems on New Providence Island. Other elements in the project include rehabilitation of the sanitary sewerage system in the City of Nassau, construction of a new sewerage line to Prince George's Wharf in Nassau Harbor, and technical assistance.

Borrower: The Water and Sewerage Corporation.
Guarantor: Bahamas.

Terms: $10.0 million equivalent. Term of 20 years with interest at 8.9 percent per annum. Total project cost: $32.0 million equivalent.

Purpose & Benefits: Water shortages and rationing on New Providence Island create hardships for both residents and tourists. Previous attempts by the Bahamas Department of Water and Sewerage to provide adequate water supplies to residents and hotels have not been successful and the situation has been deteriorating as the gap between water supply and demand widens. Frequent shutdowns for repairs of the desalination plant have been aggravating factors. The peak of the Bahamas tourist season coincides with the local dry season. An additional matter of serious concern to the authorities has been the deteriorating quality of available water because of rising salinity of the groundwater as pumping rates exceed natural replenishment rates. The natural sources of fresh water on New Providence have been developed to their limit—increased water supply can come only from desalination, catchment, cloud seeding and solar evaporation. All of these techniques require time for development but the need for new supplies is urgent. Independent studies and comparisons of alternative techniques clearly indicate that the importation of fresh water from Andros Island will take the shortest time and be the least cost solution to the problem. Reconstruction of the deteriorated portions of existing major sewerage lines is also essential to prevent serious health hazards and environmental damage. Construction of a new sewage line to intercept sewage from cruise ships is justified for the same reasons. The incremental rate of return on this investment is estimated at about 18.0 percent. Although difficult to quantify, external benefits arising from the project will be considerable, since without the project the tourist industry would be seriously and adversely affected which, in turn, would engender severe losses to the Bahamas economy.

Date Approved: July 27, 1976 (IBRD)

BANGLADESH

IMPORTS CREDIT: The proceeds of this credit will provide foreign exchange to cover imports of industrial components, chemicals, raw materials, spare parts and industrial materials required to maintain or expand production in selected high priority industries.

Borrower: People's Republic of Bangladesh.

Terms: $50.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum.

Purpose & Benefits: Bangladesh needs for program loan assistance stem from inadequate domestic savings and export earnings. Large inflows of external capital are required merely to attain a very modest growth of per capita income. At the present time, domestic savings amount to less than one percent of GDP. Thus, although investment is still inadequate, at around 7 percent of GDP, external assistance finances about 93 percent of this investment. In the public sector, foreign capital directly (and indirectly in the form of counterpart funds generated by commodity aid) contributes 75 percent of the development budget. Similarly, there is a severe imbalance in the external payments position with a marked shift in the terms of trade further exacerbating an already difficult situation as world prices for jute and tea weaken while the prices of essential imports of energy, food and fertilizer rise. Export earnings currently cover only 30 percent of Bangladesh's imports. These internal and external structural characteristics make it impossible to transfer external assistance in the amounts required to sustain a modest rate of growth in Bangladesh by means of project financing alone. Usually, it is not possible to increase the share of projects beyond one half the total development program and effectively the limits of project financing tend to be reached when it approaches the equivalent to 35 to 40 percent of total development or investment expenditures. In Bangladesh the limit may be lower, because of the relatively small proportion of large projects, and because of limited administrative capacity for project formulation. Without program assistance, such as this IDA credit, to finance imports of general commodities, the supply of non-agricultural goods in the economy would be greatly reduced and production in the industrial sector would decline substantially.

Date Approved: December 28, 1976 (IDA)

AGRICULTURE: The irrigation project this IDA credit will help finance includes: (a) construction of coastal earthfill embankments and a dam across the Feni River Channel; (b) construction of a reinforced-concrete regulator structure equipped with radial gates and flap gates; (c) construction of one major and thirty minor drainage structures equipped with flap gates; (d) improvement of about 150 km. of natural channels and the excavation of 10 km. of new channels; (e) improvement and construction of roads for access to the main project works; (f) installation of about 1,100 low-lift pumps to raise water from the channels to adjacent farmlands; (g) provision of workshops, equipment, and vehicles for maintenance of civil works and pumps; (h) construction of offices and housing for project staff; (i) transportation and agricultural equipment to facilitate agricultural extension; and (j) consultant services.

Borrower: People's Republic of Bangladesh.

Terms: $21.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. $8.6 million equivalent credit from a Canadian credit administered by the IDA. Terms identical to IDA credit. Total project cost: $52.0 million equivalent.

Purpose & Benefits: The principal benefits from this project will be increased rice production with consequent foreign exchange savings. The population in the project area will benefit directly from higher farm incomes and more employment opportunities in agriculture, transport and marketing. The project has an estimated economic rate of return of about 16 percent. The project will increase the irrigated area by 35,000 acres and ensure more reliable irrigation on 15,000 acres of currently irrigated land. This is expected to lead to a major shift in cropping patterns and increase the production of milled rice by about 35,000 tons, representing annual gross foreign exchange savings of about $9.8 million equivalent. The demand for labor will also increase substantially and create employment opportunities for landless laborers and submarginal farmers. Net farm incomes in the project area will typically increase from thirty to forty percent under the project. Present per capita income in the project area is estimated to be about two-thirds of the national average, with about 70 percent of families below the level required for minimum subsistence. Surveys and evaluation studies will also be undertaken to estimate the direct and indirect benefits of this project and to assess the socio-economic characteristics of project beneficiaries.

Date Approved: June 16, 1977 (IDA)

IRRIGATION: This IDA credit will help the Government of Bangladesh provide irrigation to about 150,000 acres in the northwest region of Bangladesh through the installation of about 10,000 small capacity shallow tubewells. The project includes a credit program for individual farmers and farmers' groups under the Integrated Rural Development Program and through two commercial banks. The project is also designed to improve workshop facilities for maintenance of irrigation equipment in the northwest region and private workshops for irrigation equipment are to be assisted under the project with spare parts, machinery and equipment as well.

Borrower: People's Republic of Bangladesh.

Terms: $16.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $25.4 million equivalent.

Purpose & Benefits: Bangladesh currently satisfies about 15 percent of its foodgrain demand through imports and achieving self-sufficiency in foodgrain production is one of the country's highest priorities. This project will help reduce the foodgrain shortages which have been averaging about 1.5 million tons per year. At full project implementation (in about four years), project tubewells are to provide irrigation to about 150,000 acres of cultivated land which is now mostly single cropped under rain-fed conditions. Total rice production in the project areas is expected to increase by about 40,000 tons and wheat production by about 51,000 tons annually. The more intensive land use as a result of the project will create additional annual farm labor requirements of about 7.5 million man-days—an increase of about 60 percent above the present level. Including secondary employment, total project-related employment is expected to increase by about 10 to 11 million man-days. Two significant aspects of the project are that nearly one-third of the total initial investment is to come from private savings (down-payments) and that tubewells to be installed involve virtually no subsidies. These are particularly desirable features, given the Government's difficult budgetary situation and the need to mobilize private savings for productive investment.

In organizing institutional arrangements for the project, however, particular attention has been paid to ensuring that small farmers have a fair chance to benefit from the project. It is estimated that, of the roughly 50,000 farm families expected to benefit directly from the project, two-thirds now have below-subsistence level income although they own about 40 percent of the land likely to benefit from the project. The estimated economic rate of return for the project is about 50 percent.

Date Approved: June 16, 1977 (IDA)

AGRICULTURE: The project is designed to support the strengthening of Bangladesh agricultural extension services in the Northwest region, to help make adaptive research more relevant to agricultural development needs and establish closer links between research and extension. Project components include: (a) the construction of housing, training and research facilities, and the provision of transportation and equipment for extension and research staff; (b) salary support for additional extension, research and statistical staff; and (c) technical assistance, consultant services and fellowships in extension and research. The project also includes a pilot program to increase irrigation facilities with about 1,500 deep tubewells.

Borrower: People's Republic of Bangladesh.

Terms: $10.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $16.3 million equivalent.

Purpose & Benefits: Field extension services to farmers will initially concentrate on simple, nearly costless, agricultural practices suitable for application by all farmers regardless of financial resources. It is conservatively estimated that, by following recommended practices, farmers will be able to increase their net income by at least 30 percent. The financial rate of return on the investment for improvement of the water distribution system is expected to be around 41 percent. Attributing a precise level of benefits to the extension and research components of this project is not feasible since expected benefits from improved agricultural practices, which require additional inputs, cannot be attributed solely to better extension and research services. Substantial improvements in the efficiency of utilization of resources can, nonetheless, be anticipated, perhaps on the order of an economic rate of return of 50 percent. Project-induced yields are expected to increase by an average of at least 20 lb./ac., since the best farmers in the region already obtain yields at least 50 percent above the national average. The irrigation component of the project will also be economically very profitable; with a high economic rate of return of as much as 75 percent.

Date Approved: June 28, 1977 (IDA)

BENIN

TECHNICAL ASSISTANCE: This is an interim project designed to prepare the groundwork for a regional development project. It is to be carried out over a two year period and includes: (a) providing technical assistance to the Societe Nationale d'Agriculture (SON AGRI) to strengthen accounting and financial management, create an Evaluation and Planning Directorate within SONAGRI, and reorganize and reinforce the training capabilities of SONAGRI (especially in the Borgou area); (b) provide trucks and staff vehicles for SONAGRI; (c) create within SONAGRI a development fund for pilot projects to be carried out in Borgou and Zou; (d) provide consultant services to formulate investment proposals for areas to be cleared of onchocerciasis, and establishing a field station in the area to develop land use programs; and (e) pursue adaptive research in cotton and food crops and organize seed multiplication for food crops.

Borrower: People's Republic of Benin.

Terms: $1.7 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $2.6 million equivalent.

Purpose & Benefits: The situation in Benin's agricultural sector can only be characterized as unsatisfactory although more favorable trends, such as the increase in the producer price for cotton and improvement in the financial management of SONAGRI, have been observed. The main purpose of the technical assistance to be provided with this loan is to build on these trends and help prepare a full-scale, second-phase project. Without the technical assistance, it is difficult to envisage that the conditions would be created in the sector in a reasonable amount of time sufficient to warrant further IDA involvement.

Date Approved: May 26, 1977 (IDA)

TRANSPORTATION: This highway project comprises: (a) improvement and maintenance of about 845 km. of rural roads, and initial maintenance of 425 km. improved under an earlier development project; (b) strengthening the Directorate of Roads and Bridges (DRB) in the Ministry of Equipment and the creation of a new Division for Feeder Roads; and (c) technical assistance to the DRB for the implementation of these programs and for the training of local staff.

Borrower: People's Republic of Benin.

Terms: $5.5 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $6.1 million equivalent.

Purpose & Benefits: The economic justification for this project relates to two types of benefits—the value-added in higher production of cash crops as a result of improved accessibility, and savings in transportation costs of normal traffic. The benefits from induced production, which represent about 80 percent of total quantified benefits, are estimated at about $8.5 million equivalent over the life of the project and will accrue directly to the farmers. Benefits from vehicle operating cost savings will, in the case of private transporters, largely be retained by them but will be partly reflected in improved standards of transportation services. In the case of Government transportation, the benefits will provide resource savings which will in part be passed on to the rural community in the forms of more efficient social and agricultural extension services and supply of inputs. In evaluating the project, the 562 km. of feeder roads were found to yield an overall average rate of return of 27 percent. In addition, about 120 km. of feeder roads to be included in later stages of the project yielded a minimum rate of return of 10 percent. The institution-building aspects of the project are of primary importance and the establishment of the Feeder Roads Division and the Interministerial Consultative Committee should ensure that the development of agriculture and feeder roads is effectively coordinated and carried out. The possible participation of rural communities in maintaining feeder roads will help reduce some of the burden of recurrent expenditures on the national budget. Social benefits are also important—the project will improve access to social services for about 200,000 rural inhabitants.

Date Approved: May 26, 1977 (IDA)

BOLIVIA

WATER SUPPLY: These World Bank loan funds will help finance the construction of water supply systems in about 70 rural communities and the cities of Potosi and Sucre, including engineering and design studies, construction of sewerage facilities in Sucre, and technical assistance to strengthen relevant Bolivian Government agencies.

Borrower: Republic of Bolivia.

Terms: $11.5 million equivalent. Term of 20 years with interest at 8.9 percent per annum. Total project cost: $15.0 million equivalent.

Purpose & Benefits: The rates of return for the urban water supply investments in this project range from an estimated 6 percent to about 10 percent. The combined rate of return for 33 percent of total project costs is set at about 8.1 percent. Meaningful rates of return cannot be calculated for the sewerage system or for the rural water supply systems to be undertaken. In addition to yielding a reasonable rate of return on the urban water supply components, the project is justified because it will lead to the introduction of important institutional, financial and investment reforms in the rural and urban water supply and sewerage sectors in Bolivia. These reforms will improve the overall technical and financial position of the sector by transferring responsibilities for building water systems in rural areas to four Departmental Development Organizations, establishing additional Community Water Committees and strengthening the executing agencies, including the Division of Urban Engineering. From the social point of view, the project will also help provide potable water for about 100,000 among the rural poor. Nearly 50,000 people are to benefit from the improved water supply systems to be undertaken in Potosi and Sucre while about 30,000 people in Sucre will also benefit from the sewerage facilities to be built under this project. Providing water supply in rural communities, Potosi and Sucre will improve living conditions and health standards by helping to control water-borne diseases and, over time, improve the productivity and incomes of Bolivia's poor.

Date Approved: September 14, 1976 (IBRD).

MINING: This loan will help finance the foreign exchange costs of investment sub-projects involving small private mines, provision of assistance to the Bolivian Geological Service (GEOBOL), and technical assistance to the Ministry of Mining and Metallurgy (MMM) (cadastral survey and sector planning) and to the Banco Minero de Bolivia (BAMIN) (staff training, project appraisal and supervision and management control).

Borrower: Republic of Bolivia.

Terms: $12.0 million equivalent World Bank loan. Term of 15 years with interest at 8.91 percent per annum. Total project cost: $18.2 million equivalent.

Purpose & Benefits: The project this loan will support is expected to contribute to mining development in Bolivia by providing investment financing to small miners. In this, the loan proceeds will fill a major gap in financing productive investment in ,Bolivia. The project will also help to develop viable mining enterprises, transform the BAMIN into a more effective development lending institution, increase the technical capability of GEOBOL, and improve Government of Bolivia mining sector analysis and planning capacities. The project is expected to lead to the upgrading of local mining consulting services and the establishment of equipment leasing and service enterprises in Bolivia. Based on a preliminary analysis of subprojects suitable for financing under this loan, it is estimated that the average economic rate of return on small mining sub-projects will be about 20 percent. The rate of return will probably be higher in the case of medium mining sub-projects to be financed because small mining investment is relatively costly (averaging $600,000 equivalent) and involves major initial outlays for the installation of equipment in currently under-equipped mines. Projections indicate that small mining sub-projects will contribute to Bolivia's foreign exchange earnings in the amount of about $110 million (net of import requirements) and, to Government revenues, about $35 million, cumulative through 1985 (equivalents). Direct employment generated from the program will be relatively minor, because of the need to mechanize under-equipped mines to increase output. Workers incomes should, however, rise as a result of increased labor productivity. Health and safety standards in participating mining firms should also improve as modernization of these mines progresses.

Date Approved: September 21, 1976 (IBRD)

EDUCATION: This World Bank loan will help finance an education development program in Bolivia covering primary and community education and vocational training. In the former area, the program includes the construction, furnishing and equipping of nearly one thousand basic classrooms, ten intermediate schools, a teacher training college, about three hundred houses for basic teachers, development of curricula and learning materials and inservice training, the introduction of bilingual (Spanish and Aymara) education in the first three grades of all project basic schools, community education and training activities, mainly via radio and mobile action programs, and a study of the educational and training needs of the low income migrant population in La Paz. The vocational training program includes the construction, furnishing and equipping of six vocational training centers, two mobile training workshops for the mining trades, training in agricultural and rural artisan occupations, and related studies of socio-economic conditions in the major highland mining areas.

Borrower: Republic of Bolivia.

Terms: $15.0 million equivalent World Bank loan. Term of 20 years with interest at 8.5 percent per annum. Total project cost: $21.4 million equivalent.

Purpose & Benefits: This project involves developing cost-effective primary and related teacher training and community education programs incorporating innovative features which, if successful, are to be expanded later on a national scale. One important aim is to help redress imbalances in the educational opportunities of the Altiplano area in La Paz Department by providing new basic school facilities for about 6,900 students annually, replacing, extending and upgrading facilities for an additional 21,850 students, and furnishing and equipping facilities for all 37,280 children in the project area. In addition, 4,590 intermediate and 425 pre-service teacher training students are to be accommodated annually in facilities to be replaced and extended under the project and 1,200 teachers and 100 school supervisors and directors will receive in-service training under the project. It is estimated that these improvements could reduce recurrent costs per student by as much as 30 percent.

Vocational training facilities are to be extended sevenfold to meet urgent requirements for trained manpower at managerial, skilled and semi-skilled levels, and to initiate new activities in the rural and mining sectors. The introduction of trade tests and a certification system will create the basis for wage differentials among skilled workers, thereby leading eventually to better earnings profiles.

Date Approved: April 12, 1977 (IBRD)

TRANSPORTATION: The principal segment of this railway development project consists of the 1977/1978 portions of the Empresa Nacional de Ferrocarriles (ENFE) Five-Year Investment Plan (1977–1981). The program involves the continued technical and financial rehabilitation of ENFE, with particular emphasis on track rehabilitation. In addition, the project will fund the updating of the 1969 Bolivia Transport Survey, implementation of the policy recommendations of this updated survey, and related technical assistance.

Borrower: Empresa Nacional de Ferrocarriles (EN FE). *Guarantor:* Bolivia.

Terms: $35.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $55.7 million equivalent.

Purpose & Benefits: ENFE's Investment Plan (1977–1981) is a coordinated rehabilitation and modernization program designed to permit Bolivian railways to efficiently carry projected traffic loads. In the absence of this Plan, declining quality of service and diminishing capability to move traffic could result in diversions to more expensive road transportation and, in areas where roads do not exist, in the failure of traffic movement altogether. The principal benefits of the Plan are: (a) lower railroad operating costs; (b) reduced costs of transporting freight and passenger traffic diverted from the railroads; and (c) fewer economic losses in areas where the railway is the only means of transportation. Other benefits will include reduced accident costs, reduced inventory costs for goods in transit, reduced breakage and spoilage of cargo, and savings from all-season rail operations. The economic rate of return for the Investment Plan as a whole is estimated at 18 percent.

Date Approved: May 12, 1977 (IBRD)

TRANSPORTATION: These World Bank loan funds will help finance the construction of two new airports (Riberalta and San Borja), major improvements at two others (Santa Ana and Tarija), the provision of navaids and communications equipment at these airports and countrywide, the provision of general and runway maintenance equipment, technical assistance, training and help in the detail design of Cochabamba Airport.

Borrower: Administracion de Aeropuertos y Servicios Auxiliares a la Navegacion Aerea (AASANA). *Guarantor:* Bolivia.

Terms: $25.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $37.5 million equivalent.

Purpose & Benefits: This project will serve the needs of about 50,000 inhabitants of the Department of Beni —and about the same number in the Department of Tarija in the south—who have not been able to develop the rich agricultural potential of those areas because of their geographic isolation from the rest of the country. Bolivia as a whole will gain from the more rapid and reliable transportation of beef from the livestock centers of Santa Ana and San Borja, rubber and nuts from Riberalta and grains, vegetables and grapes from the area around Tarija. Of these four centers, only Tarija has a road connection to other parts of Bolivia. A road is presently under construction from La Paz to San Borja but it will be usable only during the dry season and it is not expected to be upgraded to all-weather standards because of high cost. While the annual average growth rate of air traffic at the project airports has been about 15 percent, forecasts taper this rate to about 6 percent between 1985 and 1990. Cargo traffic constitutes a significant portion of traffic at three of the project airports (Riberalta, Santa Ana, and San Borja) and forecast cargo growth for these three airports is 14 percent annually through 1980, with the rate gradually declining to 8 percent between 1985 and 1990. The main economic benefits of this project derive from increased capacity and improved efficiency compared to the existing situation through such factors as the introduction of better aircraft with lower operating costs. It is expected that the presently-used piston aircraft will be replaced by small jet or turbo-prop aircraft for passengers and turbo-prop aircraft for cargo. Improvements in the aeronautical communications network and air navigational aids and runway maintenance will also significantly reduce current delays and cancellations because of bad weather. The economic rate of return for the project as a whole is calculated to be 19 percent.

Date Approved: May 12, 1977 (IBRD)

BOTSWANA

TRANSPORTATION: This road project consists of: (a) construction of the Mahalapye-Serule road (150 km.) to two-lane bituminous standards; (b) consulting services in connection with bid evaluation and construction supervision; (c) assistance in road maintenance for specified roads; and (d) the provision of training equipment and construction of new classrooms and office space for the Roads Department Training School.

Borrower: Republic of Botswana.

Terms: $20.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $26.4 million equivalent.

Purpose & Benefits: The Mahalapye-Serule road will be the last section of Botswana's arterial North-South road to be built to all-weather standards, the rest of this road (except for a southernmost section) already having been upgraded or is currently under construction. The rapid increase in road traffic due to mineral development at Orapa and Shashe, expected growth in trade with Zambia, the growth of regional centers in the eastern corridor, and potential mineral, industrial and agricultural projects in northeastern and northwestern Botswana make improvement of the North-South road a project of high priority. The Mahalapye-Serule road serves directly about 4,000 km² and 100,000 persons, and, indirectly, a population of about 240,000. In the immediate zone of influence of this road, limited agricultural development is taking place through formation of Farmer Brigades, the establishment of experimental farms and training centers and new cattle trekking routes and fattening and demonstration ranches. While industrial activity in the immediate area of the road is modest at the present time, small-scale enterprises are being developed by Youth Brigades which provide skill training for primary school leavers. Road construction represents about 82 percent of total project cost and is expected to yield a 15 percent economic rate of return.

Date Approved: April 21, 1977 (IBRD)

BRAZIL

WATER SUPPLY & SEWERAGE: The project to be supported by this World Bank loan consists of the design and construction of water supply and sewerage facilities (including surface intakes, wells, treatment plants, pumping stations, transmission lines, distribution networks and metered house connections) in several cities and towns in the State of Minas Gerais. The project also includes development of norms, policies and educational programs for implementation of sanitation systems in small communities and a study of sewerage charges for the State of Minas Gerais.

Borrower: Banco Nacional de Habitacao (BNH), Companhia de Saneamento de Minas Gerais, COPASA-MG. *Guarantor:* Brazil.

Terms: $40.0 million equivalent. Term of 20 years with interest at 8.85 percent per annum. Total project cost: $134.0 million equivalent.

Purpose & Benefits: Minas Gerais is Brazil's second most populous State and of its 14 million inhabitants more than half are classified as urban, living in 722 towns and cities of 500 or more persons. The urban areas of the State represent a cross section of the problems which are typical of Brazil as a whole. Some areas of Minas Gerais (such as the so-called "drought polygon" of the Northeast) are among the poorest regions of Brazil. Other areas (such as Belo Horizonte, the capital) are experiencing exceptionally rapid economic growth and, consequently, complex and difficult urban problems. In 1973, only 147 towns and cities in this State were considered to be satisfactorily served with water and only 84 municipalities had adequate sewerage service. The needs of the State in these sectors are pressing and the experience gained from water supply and sewerage programs in Minas Gerais can be usefully applied in other Brazilian States, especially in the needy Northeast region. This World Bank loan will help the Government of Brazil improve standards of living by increasing access to public services and employment. In so doing, the Brazilian Government also hopes to reduce migration of the poor to the major metropolitan centers. The project features selection criteria and a progressive tariff structure designed to extend sanitation services to the greatest possible number of the poor without at the same time endangering the financial viability of the State water company. Inasmuch as the program is flexible and its sub-projects are in various stages of preparation, the economic rate of return for the project cannot yet be calculated. Sub-projects already accepted for financing under a previous Bank loan have, however, estimated economic rates of return averaging 8 percent, excluding the public health and environmental benefits which cannot be quantified. The project involves certain administrative risks associated with carrying out such a complex program by a single agency. Furthermore, not all of the project's components have yet been finally identified, nor have these been subjected to appraisal by World Bank staff. Nonetheless, the project execution experience gained under previous projects suggests that the investments to be undertaken with this loan are sound and feasible.

Date Approved: July 6, 1976 (IBRD)

AGRICULTURE: The continuation of a previous agro-industries credit project wll be financed by this World Bank loan. The project encompasses the expansion and modernization of agricultural processing industries in nine Central and Southern States of Brazil (Espirito Santo, Goias, Minas Gerais, Mato Grosso, Parana, Rio de Janeiro, Rio Grande do Sul, Santa Catarina, Sao Paulo and the Federal District of Brasilia). In helping meet growing domestic and export demand for processed food and feed products, the project is designed to help the Brazilian Government's "export corridor" scheme, which aims at expanding and diversifying exports so as to ease the balance of payments constraints to economic growth. The project includes a program of credit to meat processing industries, grain and soybean handling and processing, milk processing and other agro-industries including the manufacture of agricultural inputs. The project will also fund technical assistance and training.

Borrower: Federative Republic of Brazil.

Terms: $83.0 million equivalent. Term of 15 years with interest at 8.85 percent per annum. Total project cost: $260.0 million equivalent.

Purpose & Benefits: The meat processing component of this project is expected to lead to increased and more hygienic production of meat for Brazil's domestic and export markets. Oilseed and grain processing development should lead to the consolidation of smaller, inefficient plants into larger installations and the milk processing and food/feed processing programs are expected to provide benefits in terms of more, and more efficient, production. In addition, the milk, beef processing, and miscellaneous agricultural industries are to substitute for products now imported. Financial rates of return, ranging from 14 percent to 36 percent, should provide enough incentives for private investors to participate in the project. Indicative economic rates of return for individual sub-projects range from 37 percent to 55 percent for beef processing, 45 percent for oilseed processing, 54 percent for milk processing, and 24 percent to 47 percent for miscellaneous processing. It is anticipated the project will create annual employment opportunities for about 4,000 during the construction phase and about 7,000 permanent jobs. Fiscal revenues to be generated by the project are estimated at about $32 million equivalent and net export receipts at about $216 million equivalent annually.

Date Approved: July 13, 1976 (IBRD)

POWER: This project comprises construction of transmission lines and facilities to interconnect the electrical power systems of the South and Southeastern Regions of Brazil and to provide the first phase of a 500 kV. transmission system in the South. It will include installation of about 700 single circuit km. of 500 kV. lines, construction of 1,500 MVA. of substation capacity, expansion of a 230 kV. substation, telecommunication equipment and a computerized system operating center. The project also encompasses high level training programs in Brazil and abroad to the benefit of the power sector as a whole.

Borrower: Centrais Eletricas do Sul do Brazil S.A. (ELETROSUL). *Guarantor:* Brazil.

Terms: $82.0 million equivalent. Term of 17 years with interest at 8.7 percent per annum. Total project cost: $212.5 million equivalent.

Purpose & Benefits: The interconnection component of this World Bank-financed project was found to be substantially more economical than the alternative of building a coal-fired thermal plant in Southeastern Brazil. In this respect the Brazilian Government has advised the World Bank that it does not intend to build any facility to meet expected energy deficits which could affect the economic justification of this interconnection alternative. The first phase of the extra-high voltage grid in this project was also designed to minimize investment costs. In estimating the rate of return on the interconnection component, benefits were appraised as savings in fuel costs in the operation for the base load of existing thermal facilities in the Southeast made possible by transfers of hydro-electric energy from the Southern region, the value of energy curtailments which might be unavoidable even with maximum thermal output, and the value of the 1,600 MW. of additional firm capacity gained by interconnecting the South and Southeast systems. In estimating the return on investment for the first phase of the extra-high voltage grid, benefits were appraised as the value of expected energy sales flowing through the facilities over their economic life. For both components, the costs taken into account were construction costs, marginal generation and distribution costs and expected operating and maintenance costs. Based on this analysis the return on investment for the interconnection component (costing $76 million equivalent) worked out to be 24.2 percent. The average economic rate of return on these two components (which account for 93 percent of total project costs) is 27.0 percent.

Date Approved: November 23, 1976 (IBRD)

AGRICULTURE: This World Bank loan will help finance a program to: provide agricultural credit for on-farm investments, seasonal working capital, reforestation, land reclamation and installation of electrical feeder lines and house connections to small farms; expand and improve rural extension services; develop marketing facilities; field test and demonstrate improved agricultural production techniques; construct and equip health centers and provide primary health care, basic nutrition education, and related programs; construct, furnish and equip community learning centers, a common facilities center, and two teacher training centers; and provide equipment for training farmers, school teachers, instructors and administrators. The project will also encompass technical assistance to the State Government for project administration, monitoring and evaluation.

Borrower: State of Minas Gerais. *Guarantor:* Brazil.

Terms: $42.0 million equivalent. Term of 17 years with interest at 8.7 percent per annum. Total project cost: $139.0 million equivalent.

Purpose & Benefits: The principal benefits from this project will be increased agricultural production and higher incomes for small farmers and sharecroppers. Increased yields are expected on 65,800 hectares of land now being farmed and on about 8,000 hectares of land to be reclaimed. Approximately 3,300 dairy farms and 220 swine-breeding and fattening units will expand their output and new eucalyptus plantations on 7,900 farms are to provide quantities of timber to meet local building requirements, and be sources for wood pulp for the local paper industry and charcoal for the steel industry. The financial rates of return to participating farmers are estimated to range from 16 to 29 percent and the overall economic rate of return for the project is estimated at about 22 percent. The direct beneficiaries of the project comprise 25,500 participating families (16,500 small-scale owner-operators and 9,000 sharecroppers). Of these, 89 percent own or work less than 50 hectares of land and have average annual per capita income of about $250 equivalent, or below the relative poverty line.

Date Approved: January 11, 1977 (IBRD)

INDUSTRY: This World Bank loan will help finance a project consisting of the construction of an ammonia/urea plant at Laranjeiras, Sergipe, with a capacity of 907 m.t. per day together with an adjacent 1,100 m.t. per day plant to manufacture urea. The project also provides for facilities to bag the entire urea output and to store and transport ammonia and urea.

Borrower: Petrobras Fertilizantes, S.A. *Guarantor:* Brazil.

Terms: $64.0 million equivalent World Bank loan. Term of 15 years with interest at 8.2 percent per annum. Total project cost: $283.4 million equivalent.

Purpose & Benefits: Over the life of this project the international FOB price of bagged urea is expected to average about $171 per ton in constant 1976 U.S. dollars. Since project output will substitute temporarily for imports into the Sao Paulo area, freight and handling charges are added to compute a delivered price of $185 equivalent per ton of bulk urea for use in the economic analysis of this project. For ammonia the same price of $185 equivalent per ton is used, assuming an ammonia/urea price relationship of 1:1 which reflects the production cost relationship of the nitrogen in ammonia to the nitrogen in urea. The financial analysis (in constant 1976 dollar equivalents) assumes an ex-factory urea price of $205 per ton destined for the Northeast market and $175 per ton destined for the Center. The same price assumptions are made for ammonia. Production cost, at 90 percent capacity utilization, is about $105 per ton for ammonia and $115 per ton for bagged urea. These costs are based on natural gas, vacuum gas and Bunker C oil prices of $0.84 equivalent per MSCF (1000 standard cubic feet), $58.40 equivalent per ton and $49.20 equivalent per ton, respectively. On this basis the project will earn a financial rate of return of 19 percent before, and 15 percent after, income taxes. The economic rate of return is calculated at 17 percent and will remain satisfactory even under adverse foreseeable circumstances. Net annual foreign exchange savings at 90 percent of project capacity utilization are estimated at the equivalent of $65 million, before principal and interest payments on foreign loans.

Date Approved: April 19, 1977 (IBRD)

INDUSTRY: This project comprises construction of a phosphate fertilizer plant near Uberaba in Minas Gerais, with a capacity of 1,000 m.t. per day of monoammonium phosphate (MAP) and 1,100 m.t. per day of triple phosphate (TSP). The project will also produce the intermediate sulphuric and phosphoric acids needed for fertilizer production and includes facilities for the storage and transportation of products.

Borrower: Fertilizantes Vale do Rio Grande S.A. (VALEFERTIL). *Guarantor:* Brazil.

Terms: $82.0 million equivalent World Bank loan. Term of 15 years with interest at 8.2 percent per annum. Total project cost: $294.0 million equivalent.

Purpose & Benefits: The financial rate of return on this project is satisfactory, at 14 percent before, and 11 percent after, income taxes. The economic rate of return is calculated at 22 percent. The project's import substitution role, its economies of scale, as well as its favorable location with respect to both raw materials

BRAZIL—Continued

source and market, account for the satisfactory rate of return. Sensitivity tests indicate the rate of return will still be about 15 percent even if operating costs increased by 10 percent and product prices declined by 6 percent, or if capital costs increased by 10 percent and product prices declined by 10 percent. Net annual foreign exchange savings from the project are estimated at $65 million equivalent before provision for principal and interest payments on foreign loans. The economic return of the combined Mineracao Vale do Paranaiba S.A. (VALEP)—Fertilizantes Vale do Rio Grande S.A. (VALEFERTIL) project will be 16.6 percent at 90 percent capacity utilization, and would increase to 18.4 percent at 100 percent utilization. Project risks are expected to be reduced to acceptable levels. VALEFERTIL is to develop, in consultation with the World Bank, a marketing plan to ensure the satisfactory development of the marketing and distribution system in the market area.

Date Approved: April 26, 1977 (IBRD)

EDUCATION: This vocational training project consists of building and/or furnishing and equipping industrial training centers, commercial training centers, hotel training schools, occupational safety and health training centers, and rural mobile training units. Staff training for instructors, supervisors and administrators, and preparation of instructional material and technical assistance will also be furnished under the project.

Borrower: Federative Republic of Brazil.

Terms: $32.0 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $92.5 million equivalent.

Purpose & Benefits: This project is designed to strengthen the planning and administration of the Brazilian vocational training system and for this purpose will help finance expansion of the system to sectors and areas of key importance, primarily in terms of the needs of lower income workers and job seekers. Training in the rural sector is to be more than doubled to meet an estimated 40 percent of national requirements for trained rural manpower, with emphasis on the lesser developed regions with ongoing, or planned, agricultural and rural development projects. There will be a 13 percent increase in the output of trained industrial manpower in nine project States where industry is concentrated and where demand for these skills is highest. Commercial training will be introduced for the first time in two territories and one State in the North and Central-West Regions to meet rapidly growing demand for trained tertiary sector personnel. The expansion of hotel schools, based on the "pedagogic enterprise" concept, will double the output of trained manpower for the hotel industry. To complement these programs, the project also provides for an expansion of employment information and placement services and occupational safety and health training. An economic rate of return cannot be calculated for the project as a whole. The occupational safety and health component of the project (6 percent of total project cost)—besides its obvious benefits for human welfare—will have an economic rate of return on investment of about 26 percent, based on a conservative estimate of reductions in the loss of total working hours and medical costs of accidents.

Date Approved: June 9, 1977 (IBRD)

BURUNDI

EDUCATION: This IDA credit will help finance a project to expand primary education enrollment in Burundi, improve equity in access to educational opportunities, assist in strengthening the Rural Education Bureau, expand production and distribution of textbooks, and train teachers in practical subjects related to agriculture. Specifically, the project includes: (a) the construction and equipping of 100 multipurpose learning centers; (b) the provision of equipment, vehicles and 250 tons of paper for the Rural Education Bureau's textbook-production unit; (c) the construction and equipping of facilities to train teachers; and, (d) technical assistance.

Borrower: Republic of Burundi.

Terms: $10.0 million equivalent IDA credit. Term of 50 years with a 0.75 percent service charge per annum. Total project cost: $11.7 million equivalent.

Purpose & Benefits: Productivity of small-holdings should rise significantly when a larger proportion of Burundi's population achieves the basic literacy needed to learn improved agricultural techniques. It is in recognition of this that the Government has introduced major education reform efforts and this project is to provide critical material and technical assistance in this regard. The project will help in institution-building at the Ministry of National Education and all primary-school children in the country will benefit from the provision of textbooks. The expansion of primary education capacity by about 20 percent will benefit particularly the educationally least-favored children living in rural areas where per capita incomes are estimated to be only about $40 equivalent. The principal risks in the project center on implementation. Efforts to reduce these risks include: (a) tight supervision schedules; (b) a conservative six-year implementation period; (c) the use of existing missionary apparatus for a large part of the construction in the rural areas; and (d) technical assistance.

Date Approved: February 8, 1977 (IDA)

BURMA

TRANSPORTATION: This IDA credit will help finance a project to rehabilitate facilities in the Port of Rangoon so the port does not become a serious bottleneck for the Burmese economy. Project components include the rehabilitation and repair of dredgers and the provision of various harbor vessels and tenders, and cargo handling equipment. New equipment to be purchased includes cargo handling machinery (including mobile cranes, forklift trucks, tractors, trailers, and low loaders); position finding and navigational aids for precision dredging and marking of channels; steel mooring chains and plant, machinery and ancillary equipment for replacement and/or repair of steel pontoons, sponsons, and bridges at riverside berths. In addition, resources will be provided for dredging the Rangoon Sea Access Channel and for related technical assistance and training programs.

Borrower: The Socialist Republic of the Union of Burma.

Terms: $10.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $16.2 million equivalent.

Purpose & Benefits: In recent years, Burma has been faced with an acute foreign exchange shortage which, in turn, led to inadequate allocations for essential spare and replacement parts. The equipment and installations in the Port of Rangoon consequently deteriorated sharply. This investment is designed to help correct this situation. The primary objective of the project is to ensure that Rangoon Port facilities do not seriously constrain Burma's expected growth in exports and increased import activities. Quantifiable project benefits are mainly from lower ship-waiting time and lower shipping costs through the use of larger and more efficient ships and improved cargo handling equipment. The economic rate of return for the project, based on conservative assumptions, is calculated at 37 percent.

Date Approved: December 21, 1976 (IDA)

MINING: The project this IDA credit will help support is designed to increase the foreign exchange earnings and strengthen the capacity of the Burmese mining industry by introducing tin dredging, modern ore concentration, improved gravel pump mine operations, training, and technical assistance. Specific components of the project include: (a) a tin dredge and ancillary concentrating and infrastructure facilities including a jig treatment plant, a shore-based treatment mill, a tug boat, personnel boats, a work boat, barges, and power and water supply; (b) improvements to the Kanbauk mine through improved water and power supply and better supervision; (c) a tin and tungsten concentrating and upgrading plant at Tavoy including power and water supply and vehicles; (d) equipment to rehabilitate gravel mines near Tavoy including diesel generators, drills, hydraulic monitors, pumps and jig plants; (e) overseas training for key staff, consultancy services, and a study of the future development of the mining sector in Burma.

Borrower: The Socialist Republic of the Union of Burma.

Terms: $16.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $27.8 million equivalent.

Purpose & Benefits: The most significant direct contribution of this project for the rehabilitation of the Burmese mining sector will be its effect on export earnings which are expected, on average, to increase by about $6 million equivalent annually (in 1976 prices). Other important benefits of the project include improved management, accounting and control procedures, more efficient mineral marketing, the introduction of modern technology and improved training of professional staff. The financial rate of return on the project is 10 percent and the economic rate of return is estimated to be 21 percent. Sensitivity tests indicate that the project will continue to make a positive contribution to the Burmese economy even under adverse conditions: for example, should revenues decline 20 percent, the economic rate of return would only drop to 13 percent.

Date Approved: March 8, 1977 (IDA)

CAMEROON

PORTS: This World Bank loan and IDA credit will help finance a ports development program comprising upstream port development including new fishing berths, cold storage and market facilities, a new dockyard and floating dry dock, downstream port development, including an area for handling logs, three moorings for log carrying vessels, a berth for containers and general cargo and a transit shed, entrance channel dredging, road and rail access and other port improvements, and consulting services. Construction under the program is expected to be completed by 1983.

Borrower: United Republic of Cameroon.

Terms: IDA credit of $10.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. World Bank loan of $15.0 million equivalent. Term of 20 years with interest at 8.9 percent per annum. Total project cost: $120.0 million equivalent.

Purpose & Benefits: A major element in the justification of this project is Cameroon's timber export potential. Prospects for development of forestry throughout West Africa, and specifically in Cameroon, have been studied in depth and it has been concluded that potential timber exports through Douala Port could reach about 1.1 million tons by 1985. Existing facilities at Douala cannot handle this projected volume of timber trade or the specialized log carrying vessels which are accounting for a growing proportion of world timber traffic. Creation of the log port under this project, channel dredging, and improvements in road and rail access to the port are essential if Douala is to participate effectively in this trade. Also envisaged is a progressive increase in the volume of sawn timber exports and timber products, with a corresponding reduction in crude log exports. The project's benefits include the avoidance of port congestion as this traffic develops, a reduction in delays to shipping, economies from the use of specialized log carriers, and the added value from expansion of fishing and ship-repair activities. The economic return on the project is estimated at about 17 percent, comprising 18 percent for the downstream facilities, 19 percent for channel dredging, and 10 percent for the upstream facilities. Cameroon will retain about 80 percent of total benefits from this project through increased tariffs, avoiding potential shipping surcharges, and the employment generated by expansion of the fishing fleet.

Date Approved: September 7, 1976 (IBRD and IDA).

AGRICULTURE: This project will provide for three years of agronomic trials on the Plaine des M'Bo to determine fertilizer requirements for rice and soybeans, the adaptation of soybeans to the local cropping system, and the prospects for double cropping rice. In addition, a mechanization and settlement scheme is to be initiated with settlers from the overpopulated nearby highlands to test the feasibility of establishing self-managing groups of 50 farm families on 100 ha. of land. Also included in the project are studies of the local soya market, the socio-economic characteristics of plains and neighboring highlands settlements and health control measures.

Borrower: United Republic of Cameroon.

Terms: $2.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $2.6 million equivalent.

Purpose & Benefits: This project will provide the technical and economic data on which to base decisions with respect to future investments in the plains area. Although it is conceivable the agronomic trials may demonstrate that the minimum crop yields necessary to justify further investment required to develop the project area are not attainable, preliminary results of four years of experiments and changes already made in the original project concept justify reasonable confidence that the new tests will lead to workable solutions to known difficulties. On balance, the risks in the project are considered to be worth taking, given the development potential of the Plaine des M'Bo, where at least 13,000 to 15,000 ha. could be developed to provide adequate incomes for 5,000 to 7,000 families (some 30,000 to 40,000 inhabitants in all) now living at minimum subsistence levels in the surrounding areas.

Date Approved: December 21, 1976 (IDA).

TECHNICAL ASSISTANCE: This IDA credit will help finance about 20 man/years of consultant services to strengthen key services in the Cameroon Ministries of Economy and Planning, Agriculture, Transport, Equipment and Housing, Energy and Mining, involved in investment planning, policy analysis and project processing; 130 man/months of short- and medium-term consultancies for agricultural and urban development project-related policy and project preparation studies; and about 60 man/months of consultancies for training local project personnel and the development of institutions involved in preinvestment and project activities.

Borrower: United Republic of Cameroon.

Terms: $4.5 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $6.2 million equivalent.

Purpose & Benefits: The principal benefit of this project will be the strengthening of the Cameroon Government agencies engaged in formulating and implementing effective and well-planned investment policies and development programs. The project will enhance the project preparation, implementation and supervision capabilities of the technical ministries, and help develop an expanded pipeline of projects suitable for domestic and external financing. Risks in the project will arise mainly from possible delays in recruiting quality consultants and appointing local technicians. To minimize this problem it is planned to entrust overall responsibility for the coordination of project operations to the Secretary-General of the Ministry of Economy and Planning and to provide a project coordinator to help carry out this function. All contracts for consultant services will be subject to IDA approval.

Date Approved: December 21, 1976 (IDA).

AGRICULTURE: Over a five-year period this project will provide for: (a) the establishment of 6,000 ha. of high-yielding selected oil palm (Kienke estate) and the first phase of a palm oil processing factory; (b) the development of 2,000 ha. of smallholder oil palm plantations; (c) land clearing for 1,000 ha. of oil palm, and the planting and maintenance of 1,330 ha. of oil palm (M'Bongo estate); (d) harvesting and collection equipment and staff housing for the several estates and expansion of an oil processing mill; and, (e) construction, equipping and furnishing of a headquarters service complex at Douala.

Borrower: Societe Camerounaise de Palmeraies (SOCAPALM). *Guarantor:* Cameroon.

Terms: $18.0 million equivalent World Bank loan. Term of 20 years with interest at 8.5 percent per annum. $7.0 million equivalent World Bank Third Window loan. Term of 24 years with interest at 4.5 percent per annum. Total project cost: $38.5 million equivalent.

Purpose & Benefits: The direct benefit of these investments consists of increased palm oil production which will be used mainly to meet local demand which would otherwise be satisfied through imports or not at all. The ex-harbor value of additional oil and kernel production at peak production is expected to be some $11.0 million equivalent per annum, of which about 55 percent will represent local value added. Smallholders participating in the outgrower program stand to benefit from higher cash incomes. It takes about five years for oil palm to enter into production; after that, net cash incomes should rise per man-day worked from an initial $1.80 equivalent (in line with wages of unskilled workers on the estates) to $11.20 equivalent in year 8. On the basis of current revenue and cost projections, the annual cash return on Government and other public investments in SOCAPALM will be some $16.3 million equivalent by 1996 from project plantings alone and about $28.5 million equivalent from existing plantings. The economic rates of return for the several project components range from 14 percent to 23 percent with the weighted average rate of return being about 15 percent.

Date Approved: March 29, 1977 (IBRD)

RURAL DEVELOPMENT: This project will help finance the establishment of institutional structures for channeling and monitoring the effective use of resources for small-scale rural development projects aimed at improving productive activities and developing infrastructure facilities. Components of the project include: (a) improving bottomland for rice cultivation; (b) developing irrigated market gardening (onions and vegetables) by providing credit facilities; (c) developing commercial stall fattening of steers with credit; (d) constructing ten small dams; (e) increasing and improving village water supplies; (f) providing funds for various other sub-projects; and (g) providing technical assistance.

Borrower: United Republic of Cameroon.

Terms: $7.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $9.7 million equivalent.

Purpose & Benefits: This project will have major institutional impact. The Government's rural development agency (FONADER) will be strengthened through the creation of a Fonds Special d'Actions Rurales (FSAR) unit, which is to serve as a fund-channeling mechanism for rural investment. In addition, the project will assist in the development of preparation, implementation and supervision capabilities for rural development and small farmer credit projects and the implementation of a reporting and monitoring system and accounting and procurement procedures. The regional field services of the Ministries of Agriculture, Livestock and Mines and Energy will be strengthened and staff will acquire on-the-job experience in the implementation of simple rural works. Bottomland development, market gardening and stall fattening will provide substantial direct benefits for about 2,400 farm families. Net cash return per man-day is expected to increase for bottomland development from $4.90 to $10.00, for market gardening from $1.30 to $5.70, and for stall fattening from $0.60 to $1.08 (equivalents). Economic rates of return are estimated at 22 percent for bottomland development, 20 percent for market gardening, and 34 percent for stall fattening. The overall rate of return for these sub-projects (which, together, involve nearly one-third of total project cost) is 26 percent. The major benefit from the village water supply component will be an improved quality of life for about 120,000 rural families. The project will improve water quality and contribute to reducing health hazards. Daily overall water availability will rise from 15 to 25 liters per capita and the burden of carrying water over long distances will be greatly reduced—a particular benefit to rural women.

Date Approved: June 30, 1977 (IDA)

CHAD

AGRICULTURE: This project is designed to increase rice production by small farmers in an area of 11,000 ha. on the Sategui-Deressia plain in southeastern Chad. The principal components are: (a) construction of 2 polders covering 4,000 ha.; (b) construction of feeder roads to serve the entire project area; (c) rehabilitation of an agricultural research station; (d) construction of a rice mill; and (e) feasibility studies for a second phase of the project. This IDA credit is needed to finance a portion of cost overruns which have been encountered in implementing the project. The African Development Fund (AFDF) is expected to finance the balance of these cost overruns.

Borrower: Republic of Chad.

Terms: $8.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $13.0 million equivalent.

Purpose & Benefits: In August 1974 and June 1975, bids were sought by the Government of Chad for irrigation works and buildings for this project. On both occasions the bids received far exceeded appraisal estimates. The Government, therefore, together with the AFDF and IDA agreed to reformulate the project through cost-cutting, rephasing and by using more labor-intensive construction methods. Detailed plans for the development of a 300 ha. pilot scheme, using labor-intensive methods were prepared and preliminary plans for the subsequent development—along the same lines—of the full project were put in hand. Implementation of the pilot project began in January 1976 and was completed in June 1976. Encouraged with the results of the pilot scheme, IDA staff felt that a complete project could be developed and successfully implemented with an appropriate mix of capital and labor intensive methods. This, however, required: (a) firm estimates of the cost of heavy earthmoving and agricultural equipment; (b) more detailed analysis of the performance and operating costs of earthmoving equipment in the project area; and (c) an updated estimate of building construction costs and consultants' fees. The main reasons for the increased cost of the project are: (a) world-wide inflation and, in particular, the sharp increase in international transportation costs which represent a relatively high proportion of total costs in a landlocked country such as Chad; (b) continuous, and recently, accelerated inflation in local prices; (c) delays in project implementation because of initial bidding and cost overruns; and (d) lengthening the project implementation period from two to four years. The revised project has an estimated economic rate of return of 12 percent.

Date Approved: August 10, 1976 (IDA)

RURAL DEVELOPMENT: This credit will help finance a project comprising development and initial operation of 42 small-scale pump irrigation perimeters (about 970 irrigated ha.) and five service centers along the northern Chari River; construction of 200 warehouses in the Cotton Zone; rehabilitation of a pastoral well network (about 300 lined walls) in the Sahelian Zone; establishment and initial operation of a tubewell drilling and open well maintenance unit to serve villages in the Cotton Zone; buildings and equipment for animal-feed production and poultry marketing; and, land improvements and water control works in the bottomlands of the Cotton Zone.

Borrower: Republic of Chad.

Terms: $12.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $13.4 million equivalent.

Purpose & Benefits: The principal economic benefits of this project include cotton, wheat and sorghum production from small-scale irrigation, wet season paddy production from bottomlands, increased meat and milk production, reduced losses of farm inputs arising from poor warehouse facilities, the re-opening of feeder roads and unit transport cost savings, and increased throughput and unit cost savings in animal feed production and poultry marketing. Cotton lint is to be exported; wheat and paddy will substitute for imports and sorghum is to help meet growing domestic food-grain demand. No marketing problems are anticipated and about 47,000 small farming or pastoral families are expected to receive increased incomes under the project and an additional 26,000 families will benefit from improved village water supplies. In sum, 73,000 families (about 400,000 rural inhabitants) will enjoy direct tangible benefits from this project. The per capita income level of most project beneficiaries falls within the range of $55 to $65 (equivalents). The economic rate of return is estimated to be 11 percent for small-scale irrigation, 20 percent for warehouses, 19 percent for pastoral wells, 19 percent for feeder road improvement, and 14 percent for bottomland development. The overall rate of return on these sub-projects including overhead costs, is estimated at about 17 percent.

Date Approved: November 30, 1976 (IDA)

CHILE

AGRICULTURAL CREDIT AND AGRO-INDUSTRY: Long-term credit will be provided under this project to approximately 4,300 small farmers and ranchers who, either individually or as members of cooperatives, farm 12 ha. of land or less. At least twenty percent of project funds are to be earmarked for approximately 2,500 "mini-fundistas" who own only five ha. of land or less. Other credits will be made available to an estimated 500 medium-sized farmers and ranchers and some 80 agro-industrial enterprises. The long-term credits to be provided under this project will finance on-farm improvements in the fruit, vineyard, beef, sheep and dairy product fields as well as the installation, modernization and expansion of related agro-industrial facilities.

Borrower: Republic of Chile.

Terms: $25.0 million equivalent World Bank loan. Term of 17 years with interest at 8.7 percent per annum. Total project cost: $62.5 million equivalent.

Purpose & Benefits: The principal objectives of this project are: (a) to increase earnings and improve liv-

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ing conditions for 500 medium- and 4,300 small-sized farmers and their families (some 28,800 persons); (b) to provide livelihoods for an additional 24,600 persons through the creation of new employment opportunities for the rural poor, either on participating farms and ranches or in agro-industries; and (c) through increased export of fruit, vineyard and processed agricultural products and lower imports of livestock and dairy products, to earn, or save, the equivalent of $46 million (equivalent) in foreign exchange for Chile annually at full project development. Most project beneficiaries are in Chile's lowest 30 percent income group and the majority of the farmers and ranchers who are expected to participate are either land reform beneficiaries (farming only 12 ha. of land or less) or "mini-fundistas" who own only 5 ha. of land or less. These two groups together are expected to receive about half of the funds to be made available under this project. To assure that special efforts are made to assist the poorest and smallest farmers, it has been agreed that a minimum of 20 percent of project funds will be earmarked specifically for the "mini-fundistas." The overall economic rate of return of the project is estimated at 27 percent, varying from a low of 22 percent for the fruit, cold storage and vineyard components to 39 percent for wine processing.

Date Approved: December 21, 1976 (IBRD)

POWER: This World Bank loan will help finance a comprehensive program designed to restore reliable electric power service in Chile. This will include improvements in the Empresa Nacional de Electricidad S.A. (ENDESA) transmission and distribution network to correct overloads and meet expected growth in demand; the purchase of equipment to maintain ENDESA facilities and perform specialized construction work; the installation of a modern load dispatching/telecommunications system to enable ENDESA to operate its Central Interconnected System (CIS) more efficiently; the provision of spare parts for existing hydro and thermal plants; installation of new generating equipment or the conversion of existing units to permit the burning of cheaper fuels; and consulting services to help prepare future projects.

Borrower: Empresa Nacional de Electricidad S.A. (ENDESA). *Guarantor:* Chile.

Terms: $35.0 million equivalent. Term of 17 years with interest at 8.7 percent per annum. Total project cost: $107.9 million equivalent.

Purpose & Benefits: The varied components of this project will help restore reliable power service in Chile by overcoming some of the more serious operating problems facing ENDESA caused by under-investment in recent years. Particular problems to be dealt with include system overloads with concomitant energy losses and voltage reductions, service curtailment because of outages at old generating equipment, and high maintenance and construction costs caused in part by frequent breakdowns of ENDESA's construction and transportation services. Since most of Chile's industry (including large portions of the mining sector and most agro-industries) and the railroads rely heavily on public service electricity supply, the restoration of reliable electric service is vital to the economy. Expansion of output and employment in virtually all of Chile's productive sectors (or even maintenance of present levels) depends to a considerable degree on the smooth operation of the ENDESA power system. Conversely, disruptions in power service will seriously hamper growth, the generation of new jobs and increased exports. Seen in this context, the project cost is low in relation to potential benefits. At the present time only 35 percent of Chile's rural inhabitants have access to public-service electricity supply and the Government has formulated a Rural Electrification Plan which envisages providing electric service to an additional 100,000 rural families (600,000 persons) by 1982. Nearly half of this project's components will benefit regions with low rural poverty indices and in which two thirds of the inhabitants were classified as "extremely poor" in a nation-wide survey carried out by Santiago's Catholic University and the Planning Office in 1974. The project components represent least-cost solutions to ENDESA's most pressing needs and the rate of return on ENDESA's 1977–81 investment program, of which the project is a comparatively small part, is estimated to be about 26 percent.

Date Approved: December 21, 1976 (IBRD)

COLOMBIA

AGRICULTURE: This World Bank loan will help finance the intensification of production on small land holdings (less than 20 ha.) in several highland regions where serious rural poverty problems prevail. Advisory services for farm development and operation, tree planting, soil conservation and produce marketing will be provided plus training courses for staff and farmers. Other project components include credit for farm operations marketing and development, construction of rural roads, and provision of equipment for rural primary schools. A rural health service is to be extended to cover 80 percent of the rural population in the project area. Domestic water supply schemes are to be developed and a rural electricity network will be extended. Programming, budgeting and the evaluation of the project will be carried out by the National Department of Planning, while central administration of the project will be undertaken by the Agricultural Credit Bank (Caja Agraria).

Borrower: Republic of Colombia.

Terms: $52.0 million equivalent. Terms of 17 years with interest at 8.7 percent per annum. Total project cost: $131.0 million equivalent.

Purpose & Benefits: At full project development (year 5). 23 percent of the small farmers in the areas served are expected to benefit from the supervised credit component of this project and the value of additional production of crops will be $22.6 million and of livestock about $12.3 million (equivalents). Additional amounts of beef and sugar for export will help Colombia's agricultural sector continue to play a significant role in foreign trade and the increased production of wheat and pulses is expected to result in foreign exchange savings. Net annual foreign exchange savings are estimated at about $15 million equivalent. Other commodities produced will be used for domestic consumption and will help meet rising demand and contribute to improved rural nutritional standards. The number of persons who will benefit, directly or indirectly, from the project is estimated at approximately 1.5 million. It is expected that at full project development, 32 percent of additional income generated will accrue to families currently receiving annual incomes of less than the equivalent of $29 equivalent per capita and 74 percent will be received by families now earning annually less than the equivalent of $98 per capita. At the farm level, the project is expected to require an additional 1.3 million man-days of labor annually, or the equivalent of 6,500 new full-time jobs. The project's economic rate of return is estimated at 22 percent for the productive components (credit, technical assistance, rural road development and the project management unit) which account for 82 percent of total project cost.

Date Approved: December 23, 1976 (IBRD)

AGRICULTURAL CREDIT: This project is in support of a three-year lending program by the Banco de la Republica (BOR) designed to help finance on-farm investments by commercial farmers and to effect priority investments in agro-industries. A portion of the loan ($14 million equivalent) will be reserved for re-lending exclusively to small commercial farmers.

Borrower: Banco de la Republica (BOR). *Guarantor:* Colombia.

Terms: $64.0 million equivalent. Term of 15 years with interest at 8.7 percent per annum.

Purpose & Benefits: This project is considered to be high priority because it will help reduce the constraints set on Colombia's agricultural sector by the absence of long-term credit facilities and inadequate levels of small farmer savings. Removal of these constraints should lead to higher output, increased exports, increased employment, and improved incomes for Colombia's poorer classes. The overall economic rate of return for the project is estimated at about 28 percent (22 percent for livestock, 38 percent for crop farms and 25 percent for agro-industries). The annual value of the added output of rice, cocoa, soybeans, sugarcane, cotton, fruits and vegetables, beef, and milk, will be about $86 million equivalent when the project is fully developed. Increased rice, cotton and beef production will be largely exported while the added output of cocoa and soybeans should save foreign exchange since these commodities are now imported. Net foreign exchange savings under the project at full development are expected to be about $50 million equivalent annually. Increased crop production is needed to meet the rising demand stemming from growing per capita income. The expanded production of basic grains, fruits and vegetables, and milk will also help to alleviate protein and calorie intake deficiencies among the lower income groups. The project is expected to provide wage employment on farms and in agro-industries for roughly 8,000 workers and family labor use will rise on about 5,000 small farms.

Date Approved: December 28, 1976 (IBRD)

INDUSTRY: The proceeds from this World Bank loan will help provide term financing to more than six hundred small-scale industrial enterprises for investments relating to expansion, renovation, or relocation of installed productive capacity. The project also involves hiring of consultants needed by the Corporacion Financiera Popular (CFP) and/or its clients. Given the substantial unsatisfied needs of smaller firms, at least 50 percent of the proceeds of the loan are to be channeled to industrial enterprises with total assets of less than $300,000 equivalent.

Borrower: Banco de la Republica (BR). *Guarantor:* Republic of Colombia.

Terms: $15.0 million equivalent World Bank loan. Term of 15 years with interest at 8.2 percent per annum. Total project cost: $42.0 million equivalent.

Purpose & Benefits: Substantial economic and social benefits are expected to result from this project. Most significantly, the project will provide credit facilities to a group that has been generally denied access to term financing. In addition, it will help develop local management capacity and contribute to the broadening of business ownership in Colombia, while at the same time creating new employment opportunities. Given the expected wide geographical distribution of sub-loan recipients, the project will support Colombian Government policies of encouraging more balanced regional development and decentralized economic growth. The project financial rate of return will be satisfactory—probably in excess of 20 percent.

Date Approved: June 7, 1977 (IBRD)

TELECOMMUNICATIONS: This project provides for: (a) the expansion of telephone exchange facilities (primarily in provincial and rural areas) by 95,000 lines and the connection of about 75,000 additional subscribers; (b) installation of microwave radio and multiplex equipment to increase circuit capacity by about 8,800 long distance circuits; and, (c) connection of about 2,2000 rural communities to the national telephone network.

Borrower: Empresa Nacional de Telecommunicaciones (TELECOM). *Guarantor:* Republic of Colombia.

Terms: $60.0 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $167.7 million equivalent.

Purpose & Benefits: This project will help satisfy the sizeable unfilled demand for telecommunication services, particularly in unserved (predominantly rural) areas. The timely delivery of goods and services will be facilitated and this will contribute to improved efficiency in industry, commerce, agriculture and services. The project will also assist in institution-building by promoting the consolidation and rationalization of Colombia's telecommunication facilities. The rate of return on the project is estimated to be about 21 percent. This return calculation, however, understates benefits to subscribers in business, industry and agriculture, and does not include estimated revenues from additional lines which will be connected in the future and for which this project will create capacity.

Date Approved: June 7, 1977 (IBRD)

TRANSPORTATION: This project includes: (a) rehabilitation of about 978 km. of paved trunk roads; (b) institution of a vehicle weight control program, including installation of about twenty weighing stations; (c) a highway maintenance program including acquisition of about 800 units of highway maintenance equipment, spare parts, workshop equipment and store extensions; (d) related logistic support including the purchase of vehicles, road marking, laboratory and drilling equipment, and (e) technical assistance.

Borrower: Republic of Colombia.

Terms: $90.0 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $153.7 million equivalent.

Purpose & Benefits: Detailed economic assessments have been made for the three principal components of this project for which quantifiable benefits can be esti-

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mated (the Road Rehabilitation Program, the Highway Maintenance Program, and the Vehicle Weight Control Program). The average weighted rate of return for the project as a whole is estimated at over 90 percent. The Rehabilitation Program has a weighted economic return of 36 percent, with first year benefits of 23 percent. Benefits of the Rehabilitation and Maintenance Programs of the project include avoided higher vehicle operation costs which, in turn, would have eventually raised the cost of exports and internally-consumed goods. Execution of the project is expected to result in immediate financial benefits for the road transportation industry—but since this industry is quite competitive in Colombia some of these financial benefits should eventually flow to the rest of the country, thereby ensuring a wider distribution of project impact. Additional benefits from the project which are not included in these calculations include those deriving from all-year road operation. Some of the project roads service ports and facilitate Colombia's exports. Their interruption or continued deterioration would create serious disruptions of domestic economic activity. Finally, the project civil works will help create jobs for up to 3,000 skilled and unskilled workers during the project implementation period.

Date Approved: June 28, 1977 (IBRD)

CONGO

EDUCATION: This World Bank loan will help finance an educational project comprising construction and conversion of buildings, and furnishing and equipping a primary teachers college, an educational publications unit at the National Institute for Pedagogical Research and Action (INRAP), a technical teacher training program at the secondary teacher training institute, a forestry school, and planning units in the two Ministries of Education. Technical assistance and fellowships will also be financed in connection with this project.

Borrower: People's Republic of the Congo.

Terms: $8.0 million equivalent. Term of 20 years with interest at 8.7 percent per annum. Total project cost: $11.4 million equivalent.

Purpose & Benefits: This project will strengthen the Congo's education system in several essential areas. A major purpose is the qualitative improvement of learning opportunities, especially at the elementary level, by expanding and improving primary teacher training to decrease pupil/teacher ratios and the proportion of untrained teachers. This training program will also provide pedagogical support to primary schools in the relatively more disadvantaged northern part of the Congo. Local preparation and production of textbooks and other educational materials are expected to contribute to qualitative improvements in education by increasing the suitability and availability of books and related materials. In this process, the capabilities of the Congolese pedagogical research institute to develop and test reformed curricula and instructional materials will be strengthened. The project will help adapt the education system to employment needs by establishing programs for training secondary technical teachers and middle-level forest technicians, thereby increasing the supply of technicians in sectors where manpower shortages are expected to be most acute. Finally, the project will reinforce the Government's education planning capability to program the future development of the Congolese education system.

Date Approved: December 14, 1976 (IBRD)

COSTA RICA

AGRICULTURE: This World Bank loan will support an agricultural credit program to help finance on-farm investments for livestock and dairy development, annual and perennial crop production, and the development of agro-industries, including machinery and equipment for companies or cooperatives doing contract work for farmers on land clearing and leveling. Specific project components include: (a) construction of seed storage facilities and foundation seed warehouses; (b) improvement of approximately 100 km. of rural access roads; and (c) expansion and acquisition of equipment for national agricultural extension services.

Borrower: Republic of Costa Rica.

Terms: $18.0 million equivalent World Bank loan. Term of 17 years with interest at 8.5 percent per annum. Total project cost: $37.6 million equivalent.

Purpose & Benefits: This project is designed to increase production of crops and livestock products to meet domestic demand and provide surpluses for export. In addition, at full development, the project is expected to generate added net revenues to the Government budget of about $0.4 million equivalent per year. The agricultural credit and extension service components will help farmers increase productivity and incomes and the seed program component will lead to improved crop yields. The annual value of incremental production stemming from this project is estimated at about $15 million equivalent. The financial rates of return on incremental farm investments range from 17 to 24 percent and incremental employment created will be equivalent to 2,400 full-time jobs. The feeder road component will not only serve as a pilot scheme for replication in other areas of Costa Rica but will also provide better access to markets for crop and dairy producers in the project region. The economic rate of return on farm investments is estimated at about 16 percent. The economic rate of return on the feeder road component is about 13 percent. The overall economic rate of return for the project is estimated at about 16 percent.

Date Approved: April 26, 1977 (IBRD)

CYPRUS

TRANSPORTATION: This World Bank loan will assist in financing a project comprising construction of the first two lanes of a new Nicosia-Limassol highway (about 75 km.) with connecting and access roads, feasibility studies for improvement of the Limassol-Paphos highway (about 70 km.) and the highway connection between Nicosia and Larnaca (about 30 km.), detailed engineering for up to 100 km. of high priority roads, studies and technical training.

Borrower: Republic of Cyprus.

Terms: $10.0 million equivalent. Term of 15 years with interest at 8.7 percent per annum. Total project cost: $25.7 million equivalent.

Purpose & Benefits: The Nicosia-Limassol road, built in 1930, was judged to be inadequate in 1973 and since that time the need for improvement has become urgent because of the rapid increase of traffic on certain sections of the road. In addition to serving several growing urban centers this highway has taken on added importance as the essential arterial link between Nicosia, Limassol, and the international airport at Larnaca, which are the principal points of ingress and egress for all goods and passenger traffic in southern Cyprus. These three centers can be expected to continue to develop and generate considerable traffic in the future while playing possibly an important role in the interchange of goods, services and people between north and south. In addition, the project highway will serve cement manufacturing centers at Vasilikos and Moni, the pyrites mines at Kalavasos, the port of Vasilikos for ore exports and growing agricultural areas in the south. The new highway to be financed will be able to handle projected traffic at adequate service levels with overall improvements in safety and efficiency conditions. Given the uncertain political situation in Cyprus, the economic evaluation of this project considered three possible cases: (1) no communication between north and south; (2) freedom of communications, but no major resettlement of population and no integration of economic activities; and (3) complete restoration of the pre-1974 situation. Traffic is expected to grow between 1975 and 1986 at 4 to 6 percent annually. The economic analysis indicated that the project is a high priority investment not only under present circumstances, but also for the island as a whole. Based on construction of only the first two lanes, the economic return on the project is estimated at 23 percent in case 1 and 26 percent in case 2, with returns on individual sections varying from 34 to 12 percent. A preliminary analysis indicates the economic return of the proposed project would also be satisfactory for case 3.

Date Approved: November 30, 1976 (IBRD)

DOMINICAN REPUBLIC

TRANSPORTATION: This World Bank Third Window loan will help finance a highway program in the Dominican Republic encompassing road reconstruction and rehabilitation, the widening and reconstruction of bridges, a road maintenance program including the purchase of maintenance tools, equipment, and spare parts, the rehabilitation and reconstruction of workshops, and consulting services.

Borrower: Dominican Republic.

Terms: $5.0 million equivalent Third Window loan. Term of 25 years with interest at 4.85 percent per annum. Total project cost: $8.2 million equivalent.

Purpose & Benefits: The overall economic rate of return on this project is estimated to be 24 percent. The economic return for reconstructing the Puente Camu-San Francisco de Macoris Road (which accounts for 34 percent of project costs) is 29 percent. Sensitivity analysis indicates that if construction costs were to increase by 25 percent and traffic were to be 50 percent below forecast, the economic rate of return would still be 19 percent. The economic return for the maintenance program (50 percent of project costs) is estimated at 20 percent. Consulting services in this project are justified because they will assist in achieving reforms to increase efficiency in highway maintenance planning and administration, and in necessary improvement and maintenance of the Dominican Republic highway network. In addition, other benefits will derive from the reduction in the need for future investments for road reconstruction. Indirect social benefits will also arise from the project. Improved maintenance should make many roads usable under all-weather conditions, thereby providing the rural population with more reliable access to urban facilities (such as hospital services).

Date Approved: July 13, 1976 (IBRD)

HEALTH: This project is designed to shift emphasis from curative to preventive health services, including family planning, in several Health Regions of the Dominican Republic. It will help establish programs for family planning, training and motivation by providing special equipment, vehicles, travel allowances for family planning training coordinators and support staff, and financing for the operating costs of field worker training. Clinical services and facilities are to be improved through the construction and equipment of 26 rural health clinics and one health sub-center. Operating costs for a distribution program for contraceptives in rural areas will be included, together with technical assistance for health service delivery, health administration, information systems and statistics, research, training program and various types of physical facilities.

Borrower: The Dominican Republic.

Terms: $5.0 million equivalent World Bank Third Window loan. Term of 25 years with interest at 4.9 percent per annum. Total project cost: $7.5 million equivalent.

Purpose & Benefits: Reduced population growth should assist the Dominican Republic Government to achieve its development objectives including particularly increased educational levels, improved health and nutrition and lower unemployment. The project is to be part of a national family planning effort designed to reduce fertility rates from 7.1 in 1970 to 3.4 by the year 2000. The family planning effort is expected to account for more than 80 percent of this fertility reduction, socio-economic factors being relied upon for the remainder. This project, by improving health and family planning services delivery and creating demand for family planning, can be expected to contribute directly to about one-fourth of the fertility reduction forecast under the family planning program.

Date Approved: September 14, 1976 (IBRD)

ECUADOR

INTERMEDIATE CREDIT INSTITUTION: This World Bank loan will provide resources, through participation in development financing companies, for equity and term financing to industry for creating productive facilities and resources to strengthen Ecuador's development banking system and improve Ecuador's capital markets.

Borrower: Republic of Ecuador.

Terms: $26.0 million equivalent. Term of 15 years with interest at 8.7 percent per annum.

Purpose & Benefits: The economic benefits of sub-projects to be financed under this loan will be similar to those for the two other World Bank DFC operations in Ecuador: an average internal economic rate of return of about 30 percent is expected for the projects and about 80 percent of the sub-loans is likely to be aimed at import substitution or export expansion. Direct employment generated by sub-projects may be modest but substantial indirect employment effects are expected because the beneficiary industries will tend to have backward linkages to the labor-intensive agricultural and forestry sectors. The project calls for a more appropriate differentiation among interest rates on medium- and long-term lending using Bank funds. Furthermore, through its overall support of the participating financial institutions and appropriate policies for industry, the World Bank expects to make meaningful contributions to a high industrial growth rate in Ecuador. A 9.4 percent industrial growth rate is needed to assure labor absorption adequate to Ecuador's rapidly growing needs.

Date Approved: December 28, 1976 (IBRD)

TRANSPORTATION: The proceeds from this World Bank loan will help finance: (a) civil works and related supervision for the construction of a 25 km. four-lane paved highway between Duran and Boliche; (b) civil works and related supervision for the construction of a 29 km. development road between Puerto Ila and Doblones and for the construction and improvement of about 75 km. of lateral feeder roads in the area; and (c) pre-investment and organizational studies for the preparation of a regional secondary and feeder road program.

Borrower: Republic of Ecuador.

Terms: $17.5 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $38.1 million equivalent.

Purpose & Benefits: The economic justification of the Duran-Boliche highway relates to lower vehicle operating costs, passenger time savings, reduced road maintenance costs and fewer road accidents. Present traffic on this highway varies from 5,800 to 4,330 vehicles per day and heavy vehicles (which account for about 48 percent of traffic) carry passengers and goods between production centers in the Costa and Sierra and the port city of Guayaquil. A wide variety of agricultural products (bananas, rice, sugar and livestock) for local consumption and export, as well as imported goods, is carried on the highway. Vehicle operating cost savings account for about 55 percent of total quantifiable benefits for existing and projected traffic volumes. Passenger time savings account for another 35 percent of quantifiable benefits from this project while lower road maintenance costs and fewer accidents account for the remainder. The economic rate of return for this segment of the project will be about 20 percent. The Puerto Ila-Doblones road will open access to agricultural production areas in Pichincha and Manabi provinces, well suited for pastures and various cash crops such as oil palm, rubber, abaca, platano, citrus, corn and cassava. At the present time, the extent and intensity of cultivation and levels of agricultural productions in this area are well below the potential owing to a lack of basic transportation facilities and of public programs to support agricultural development. Farm holdings larger than 100 ha. constitute less than 5 percent of all farms and cover less than 20 percent of the area. Most holdings in the project area fall between 20 and 50 ha. The number of farm families is estimated at 1,300 with a total population in the project area of about 10,000. This road, together with the related lateral feeder roads, has an estimated economic rate of return of 18 percent.

Date Approved: May 19, 1977 (IBRD)

AGRICULTURE: This project will provide credit facilities to finance: (a) livestock development, including pasture improvement and renewal, fencing and other infrastructure, machinery and equipment and breeding stock; (b) development of crop farms in selected areas covering investments such as irrigation canals and pumps, land clearing and development, building improvements, storage facilities, and rehabilitation of permanent crops; (c) small local industries such as the processing of meat, poultry, vegetable oil, balanced feed and wood products; and (d) development of agricultural consulting services.

Borrower: Republic of Ecuador.

Terms: $15.5 million equivalent World Bank loan. Term of 14 years with interest at 8.2 percent per annum. Total project cost: $36.0 million equivalent.

Purpose & Benefits: The benefits of this project will be reflected in added output of agricultural products and derivatives. The value of the increased output anticipated will be about $12 million equivalent per year and will consist mainly of corn, oilseeds, vegetables, rice, beef, mutton and wool. Based on expected yield increases, the economic rate of return on the agricultural and livestock components of the project is estimated at 20 percent. Previous agricultural credit programs achieved technical success largely by channeling credit and technical assistance to a relatively small number of commercial producers. By contrast, the credit facilities of this project are aimed at ensuring greater availability of institutional credit to a significant number of small-scale farmers—thereby contributing to a more balanced distribution of income in Ecuador. It is expected that this project will reach about 1,500 rural families classified as small farmers and most of whom have income levels well below the national average. Since the small industries component of the project takes the form of a line of credit, economic rate of return calculations are not feasible. Tentative estimates of the financial results of enterprises of the type to be financed, calculated from illustrative profiles, however, suggest rates of return on the order of 20 percent. Direct employment generated by sub-projects of this component of the project, tentatively estimated at about 1,000 persons, will also contribute to expanding incomes in rural areas.

Date Approved: June 14, 1977 (IBRD)

EGYPT

EDUCATION: This project is designed to expand, diversify and upgrade the training of technicians and skilled and semi-skilled workers, introduce comprehensive lower and upper secondary schooling on a pilot basis, increase and upgrade the training of primary school teachers, technical teachers and workshop instructors, and improve educational and manpower planning.

Borrower: Arab Republic of Egypt.

Terms: $25.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $54.2 million equivalent.

Purpose & Benefits: At this point in Egyptian economic development, this project will create the physical and institutional base needed to increase supplies of scarce manpower trained in technical specialities for the industrial and construction sectors. Government strategy for future years is to increase investment and production in these two key sectors of the economy through private sector, joint venture and public sector activities. This objective cannot be achieved, however, unless sufficient personnel with practical training suited to the present and future needs of industry are available. By providing an annual output of 17,000 semi-skilled workers for the construction sector, 6,400 technicians and instructors, and 2,300 skilled industrial workers, the project is expected to make an important contribution towards achieving the objective of accelerating development in the productive sectors of Egypt's economy.

Date Approved: February 22, 1977 (IDA)

WATER SUPPLY: This project will provide an additional 350,000 m^3/day of treatment capacity and other facilities and services to help the Alexandria City Water General Authority (AWA) meet future water demand, cope with a water deficit now being overcome at the expense of water quality, and provide reliable water meters for improved billing and the reduction of unaccounted-for water.

Borrower: Alexandria Water General Authority (AWA). *Guarantor:* Arab Republic of Egypt.

Terms: $56.0 million equivalent World Bank loan. Term of 20 years with interest at 8.5 percent per annum. Total project cost: $121.7 million equivalent.

Purpose & Benefits: This project, together with a related Government-financed project constituting AWA's 1976–82 investment program, represents the first major expansion of Alexandria's water supply system in recent years. The project is essential if Alexandria is to avert serious water shortages and health hazards and other constraints on improving living conditions and expanding the city's increasing industrial activities. The use of fresh water from the Nile is the best solution for meeting Alexandria's water requirements, alternative methods—the use of desalted sea-water or underground water—having been found to be impractical. The project will have numerous benefits in terms of health and safeguarding basic supplies for the urban poor which cannot be realistically quantified but which are, nonetheless, significant benefits. While it has not been feasible to estimate a meaningful economic rate of return for the project, economic analysis suggests that the proposed water tariffs correspond closely to long-run average incremental costs at a discount rate of approximately 10 percent. The project is, therefore, efficient in terms of cost recovery and resource allocation.

Date Approved: February 22, 1977 (IBRD)

IRRIGATION: The objectives of this project are: (a) to prevent the decline of land productivity on one million feddans (1 fd. = 1.04 acres) in the Nile Delta by building pumping stations and remodeling the main drainage system; (b) to increase productivity on about 400,000 fd. of these one million fd. by installing field drains; (c) to expand the bilharzia control program by 1,200,000 fd., thereby extending the program over the entire cultivated area from Giza to the Aswan High Dam; and (d) to cover additional foreign exchange expenditures of a UNDP-sponsored study to draw up a "Master Plan for Water Resource Development and Use" for which the Bank is acting as executing agency. The principal project drainage works comprise four new drainage pumping stations, replacement of ten obsolete pump[illegible]s in two pumping stations; deepening and widening 1,565 km. of open main drains serving an area of 810,000 fd. and the installation of covered field drains and collectors in an area of 400,000 fd.

Borrower: Arab Republic of Egypt.

Terms: $27.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. $12.0 million equivalent World Bank Third Window loan. Term of 24 years with interest at 4.2 percent per annum. $27.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $207.0 million equivalent.

Purpose & Benefits: This project will result in substantially increased agricultural production on the 400,000 fd. to be field-drained and on the 30,000 fd. along the sides of the remodeled open drains. At full project development, yield increases are expected to stabilize at from 12 to 25 percent above present levels, producing a stream of benefits with an incremental net economic value estimated at about $33 million equivalent per year. The additional production will increase cotton and vegetable supplies for export and reduce imports of other products. In addition, the project will prevent declining crop yields on 1 million fd. The drainage component of the project will benefit 295,000 farm families (1.6 million persons) occupying small farms, more than half of which have annual incomes of below $60 equivalent per capita—the relative poverty level. At full development of the project the annual net return on a 3 fd. owner-operated holding is expected to increase from $584 equivalent to about $708 equivalent (21 percent) while for a 1 fd. tenant holding the net return will increase from $167 equivalent to $202 equivalent (21 percent). These increases tend to understate total benefits accruing to farmers as a result of the drainage works—compared with the situation without the project at year ten, the annual net return will be higher by more than 40 percent. The economic rate of return for the project is estimated to be 23 percent.

Date Approved: May 31, 1977 (IBRD and IDA)

POWER: The project is designed to: (a) improve and expand, as part of the Rural Electrification Authority (REA) ongoing program, electric power distribution systems in and around the cities of El-Mansoura, El-Fayum, Assyout, Sohag, Fuwa, Damietta, El-Mahalla, Tanta, El-Minya, Aswan, Kafr El-Sheikh, Ras El-Bar, and Karf El-Dawar and in 19 rural zones; and (b) assist in strengthening power sector institutions through technical assistance to the Egyptian Electricity Authority (EEA) and REA.

Borrower: Arab Republic of Egypt.

Terms: $48.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total program cost: $70.6 million equivalent.

Purpose & Benefits: Completion of the Aswan High Dam hydro-electric complex and the associated transmission system some six years ago made abundant electricity generating capacity available. The existing dilapidated and overloaded power distribution system, however, has prevented the benefits of this large investment from reaching much of Egypt's population. Implementation of the National Rural Electrification Plan, designed to rectify this situation, has been impeded, largely because of financial constraints. This project, which covers about 18 percent of the REA 1976–1980 work program and about 60 percent of the zones that remain to be electrified under the National Rural Electrification Plan will benefit about 6 million people, a third of whom will be receiving electricity service for the first time. Economic benefits of the project that can be quantified are the net incremental revenues accruing to the municipalities and EEA and resource cost savings through substitution of electricity for kerosene. On this basis, the economic rate of return over a 25-year service life is estimated to be 12 percent for the electrification works in the urban centers and 4 percent for works in the rural zone. The average economic rate of return on the urban and rural project components combined, which together account for 90 percent of total project costs, is 10 percent.

Date Approved: June 9, 1977 (IBRD)

INDUSTRY: This World Bank loan will support development of Egyptian industry by financing: (a) part of current public sector industry needs for raw materials, intermediate goods and spare parts ($30 million equivalent); (b) part of public sector industry needs for equipment to replace obsolete or worn-out machines which constitute bottlenecks to production ($30 million equivalent); (c) part of private sector industry needs for raw materials, intermediate goods and equipment ($8 million equivalent); and (d) technical assistance for industrial maintenance and quality control ($2 million equivalent).

Borrower: Arab Republic of Egypt.

Terms: $70.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum.

Purpose & Benefits: The need for import financing assistance to Egyptian industry relates to that country's import needs for 1978 and the foreign exchange financing gap to be covered by new commitments, currently estimated at more than $1.0 billion equivalent for 1978 and 1979. The development of industrial production, exports and employment is crucial to Egypt's economic future. The population of 38 million is almost entirely concentrated in the Nile Valley and the Delta and cannot be fed or effectively employed by the agricultural sector alone. Severe urban and rural underemployment persists and the population growth rate of between 2 and 2.5 percent per annum will lead, if unchecked, to a population of about 65 million by the end of this century. Non-industry sectors of the economy such as tourism and services, the Suez Canal, and petroleum and mining can help meet only part of Egypt's needs for foreign exchange earnings and employment. Rapid industrial growth thus is a major element in Egyptian efforts to solve its economic problems. Although Egypt has substantial industrial potential, neither industry's long-run development potential nor its short-term production objectives can be realized without relief from the constraints under which it presently operates. This World Bank loan is aimed at alleviating these circumstances.

Date Approved: June 14, 1977 (IBRD)

INDUSTRY: The World Bank loan will finance the foreign exchange costs of a feasibility study, plus detailed engineering, of an iron ore beneficiation project and a diagnostic study for the State-owned Egyptian Iron and Steel Company (HADISOLB) which is the sole consumer of the iron ore. Specifically, the project includes: (a) a feasibility study to identify a beneficiation project for Bahariya iron ore and to determine its technical and economic feasibility; (b) a diagnostic study to identify a rehabilitation and balancing project for HADISOLB's productive, ancillary and maintenance facilities, a program for strengthening HADISOLB management, and a program for improving the facilities for transporting iron ore from the Bahariya area to the HADISOLB plant; and (c) detailed engineering work, including the preparation of tender documents, for an iron ore beneficiation project, provided that studies indicate that the project is viable.

Borrower: Arab Republic of Egypt.

Terms: $2.5 million equivalent World Bank loan. Term of 10 years with interest at 8.2 percent per annum. Total project cost: $3.0 million equivalent.

Purpose & Benefits: A new iron ore deposit in the Bahariya Oasis area of the Western Desert was opened up in 1971 to supply expanded iron-making facilities being built on the basis of a project agreement with the USSR. The deposit has reserves of 120 million tons of ore and is part of the larger Bahariya ore body with some 250 million tons of proven, probable or possible reserves. The Bahariya ore body is Egypt's principal high-iron content ore reserve and substantial investments have been made at the mine where about 500 jobs have been created. Continued and improved utilization of Bahariya ore will help reduce HADISOLB dependence on imported ore. However, the sodium chloride content of the Bahariya ore impedes efficient operation of the iron making machinery and it has been concluded that a beneficiation project is the best means both of providing ore of suitable quality and keeping the El-Gedida mine in operation. This World Bank loan will help finance the necessary studies for proceeding with the beneficiation project.

Date Approved: June 14, 1977 (IBRD)

EL SALVADOR

URBAN DEVELOPMENT: Components of this project include approximately 8,000 serviced lots to be provided by the Fundacion Salvadorena de Desarrollo y Vivienda Minima (FSDVM). About 70 percent of these units are to be located in San Salvador and the rest in other cities and smaller towns. The plots will be provided with water, storm drainage, sewerage, streets, paved footpaths, and optional electricity. The project will also provide for the development of about 400 sites for small industrial or commercial use. Community facilities, including multipurpose community centers, public markets, sports areas, health clinics and schools are to be provided at project sites. In addition, the project calls for a pilot scheme to be executed by the Urban Housing Institute (IVU) involving improvement of living conditions for about 800 households now in squatter settlements, through the provision of secure tenure, basic infrastructure, community facilities, and credit for dwelling improvements.

Borrower: Republic of El Salvador.

Terms: $6.7 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. $6.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $24.5 million equivalent.

Purpose & Benefits: The economic rate of return for the serviced site component of this project is estimated at 18 percent, taking into consideration only the direct benefits (imputed rental values) and costs of the shelter to be provided. About 6,450 man-years of employment will be generated during implementation of the serviced site and pilot upgrading components of the project. In addition, the serviced site component will have an income redistribution effect by providing low-cost shelter to low-income households currently paying excessive prices for shelter. The availability of credit and technical assistance to small businesses is expected to result in increased family incomes by way of reduced borrowing costs and increased sales. The small business scheme is to be highly labor-intensive and it is estimated that about 4,800 jobs will be created by this project component, at an average cost of $735 equivalent per new job. The review of operating procedures and pricing structure scheduled to take place after about one year will help reduce risks stemming from some of the experimental features of this program.

Date Approved: June 23, 1977 (IBRD and IDA)

ETHIOPIA

IRRIGATION: This project will provide a gravity irrigation system for an area of about 10,300 ha. including settlement of 320 families (1,600 people) on 800 ha., the development of four State farms, construction of project Headquarters, a workshop, stores, staff housing and related facilities, and the purchase of operating and maintenance equipment. Specific works to be built include a diversion weir on the Awash River, irrigation and drainage networks, flood protection dikes, roads along main canals and drains and project Headquarters and related facilities. Technical assistance, including engineering supervision and the recruitment of technical personnel will also be parts of the project.

Borrower: Ethiopia.

Terms: $25.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $56.8 million equivalent.

Purpose & Benefits: The major benefits of this project will be the opening up of the Middle Awash Valley—one of Ethiopia's most promising agricultural areas—for commercial farming, thereby creating better employment opportunities for the rural population of the area (about 4,000 settlers and 12,000 workers), increased per capita incomes, and higher foreign exchange earnings from cotton exports. The cotton export potential is good and prospects for exports of other high value agricultural products clearly exist. The overall economic rate of return for the project is calculated to be 13 percent. The irrigation system to be created is relatively simple and no particular difficulties are foreseen in construction. Both the construction and operation of the irrigation system will be supervised by a firm of consultants who have been working with the implementing agency over the past four years.

Date Approved: May 10, 1977 (IDA)

TRANSPORTATION: This project is the first (1978–80) phase of Ethiopia's Five-Year Road Sector Program and consists of: (a) improvement or construction of primary and secondary roads (1,100 km.) and feeder roads (1,400 km.); (b) maintenance of main roads; (c) rural road development, including road maintenance and construction and the establishment and operation of provincial rural roads offices; (d) improvement of Ethiopia Roads Authority (ERA) management and operations; and (e) provision of loans through the Agricultural and Industrial Development Bank (AIDB) to domestic road contractors for the purchase of road construction equipment.

Borrower: Ethiopia.

Terms: $32.0 million IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $333.0 million equivalent.

Purpose & Benefits: The project will help reduce vehicle operating and road maintenance costs; open new areas for agricultural development, especially through new rural roads which will reduce transportation costs on agricultural inputs and produce and provide social services in remote areas; continue ongoing efforts to strengthen the ERA; and assist in the development of the local contracting industry through loans to purchase equipment. Individual sub-projects, exclusive of rural road construction, are estimated to yield economic rates of return of from 19 to 25 percent. The minimum return required for any main road to be financed under the project will be 12 percent.

Date Approved: May 10, 1977 (IDA)

GHANA

POWER: This World Bank loan and IDA credit will help finance a further phase of the Electricity Corporation of Ghana (ECG) expansion and development program. The project includes: (a) about 230 circuit km. of overhead and 20 km. of underground 33 kV. power lines, about 6 circuit km. of 11 kV. overhead lines with about 11 MVA. of distribution transformers, and 32 km. of low tension distribution lines; (b) 11 new substations with about 150 MVA. of transformer capacity and expansion of about 6 existing substations with about 60 MVA. of additional transformer capacity; (c) equipment, material and vehicles for rehabilitating existing sub-transmission and distribution systems; and (d) consultants services.

Borrower: Electricity Corporation of Ghana (ECG). *Guarantor:* Ghana.

Terms: $9.0 million equivalent World Bank loan. Term of 20 years with interest at 8.5 percent per annum. $9.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $26.7 million equivalent.

Purpose & Benefits: This is the third Bank Group lending operation to ECG and will help improve and extend the distribution of electric power supplies in Ghana in support of overall economic development objectives. The project is designed to reinforce the distribution network in areas already served so as to meet increased demand, replace diesel-generated power by less expensive hydropower and integrate isolated areas into the national grid, and provide improved management for ECG itself. The average annual growth rate for total ECG power consumption is forecast at 11 percent for the period 1975–80 and 8 percent thereafter. The project constitutes the least-cost solution to delivering the forecast load for a period of 15 years as compared with any other reasonable alternatives, taking into account standardization of voltages adopted in Ghana and local conditions such as the need for underground installations in some congested areas. The rate of return calculations indicate rates ranging from 0.1 percent for the distribution system in Tema (mainly because of the high proportion of energy sold at low prices for industrial use under special contracts) to 21.4 percent for the Accra-Weija scheme. The overall rate of return for the project, using current tariffs and other measures as proxies for benefits, is estimated at 10 percent.

Date Approved: March 22, 1977 (IBRD and IDA)

POWER: The project this loan will help finance consists of: (a) construction of the Kpong Dam and a four unit 160 MW. hydropower plant and an associated 60 km. double circuit, 161 kV. transmission line to Tema; (b) installation of a 25 MVAR. synchronous condenser at Prestea and a 25 MVAR. static condenser at Kumasi for reactive power compensation; (c) construction of a 161 kV., 80 km., transmission line and related substations to supply Southwestern Ghana; and, (d) addition of a 161 kV., 25 km., transmission line from Tema to Accra (Achimoto substation) and the extension of both the substations to increase the capacity of the existing system.

Borrower: Volta River Authority (VRA). *Guarantor:* Ghana.

Terms: $39.0 million equivalent World Bank loan. Term of 20 years with interest at 8.5 percent per annum. Total project cost: $236.5 million equivalent.

Purpose & Benefits: The Kpong hydro-project is needed to satisfy the growing demand for power in Ghana. Detailed analysis demonstrated that this was the least-cost solution to this problem. Demand is expected to outstrip generating capacity of existing hydro facilities by 1978. This project will add 140 MW. firm and 970 GWh. per year to the VRA system, thus allowing for normal growth plus 174 GWh. of interruptible supply for industrial heating until 1985 when additional generating facilities will be needed. Principal beneficiaries of the power to be generated by the Kpong power plant will be ECG customers who will consume about 78 percent of output by 1985. The remaining 22 percent is to be consumed by the mines and various public authorities. If benefits are assumed to be represented by the long-term marginal power cost, the rate of return on this project will be about 11 percent—although this is still an incomplete measurement of all of the actual economic benefits which will accrue to power consumers.

Date Approved: March 22, 1977 (IBRD)

GREECE

SEWERAGE PROJECT: The basic objective of this project is to help Greece reorganize the nation's sewerage sector through priority investments in the Greater Salonica and Volos Areas. The project will include, at Salonica, installation of secondary sewers, trunk and force mains, three pumping stations, gravity interceptors and a main interceptor, a primary treatment plant and the purchase of equipment for sewer inspection and maintenance. At Volos, components include secondary sewers, trunk and force mains, six pumping stations, a pre-treatment plant, a wastewater collector, final interceptor pipe and an ocean outfall.

Borrower: The Hellenic State.

Terms: $36.0 million equivalent. Term of 15 years with interest at 8.7 percent per annum. Total project cost: $113.5 million equivalent.

Purpose & Benefits: The principal benefit from this project will be the development of institutions and policies to deal efficiently and expeditiously with the long-term human, environmental and developmental problems posed by wastewater disposal in Greece. The Salonica sub-project will, specifically, help prevent further deterioration of water quality in Salonica Bay, eliminate summer odors in the city and permit the re-establishment of fishing and the reopening of bathing beaches. The project will also help alleviate unsanitary conditions created by overloaded septic tanks in the poorest areas and by the discharge of raw sewage into inland water courses. Some adverse effects are expected to stem from the discharge of primary effluent into the Axios River but this problem is expected to be serious only after 1995 when either treatment upgrading or an effluent outfall will be needed. Since the affected part of the Axios River is not populated at the present time, these adverse effects are expected to be far outweighed by other benefits from improved sanitation in and around the city. At Volos, the sub-project to be financed will permit the closing of a large number of septic tanks which now constitute a serious health hazard to the city's water supply. Deterioration of bay water quality will also be stopped. Preliminary oceanographic studies indicate that the outfall location should allow adequate dilution of effluent. While there is increasing recognition of the benefits to be derived from well-conceived sewerage projects, these benefits are difficult to quantify. This project can, however, be expected to improve health conditions, increase property values and improve fishing and recreation facilities. Moreover, the two sewerage systems are essential to the orderly development of these two cities. The methods of collection, treatment, and disposal of sewerage are considered adequate and represent the least-cost solution to the problem in each project area.

Date Approved: December 7, 1976 (IBRD)

REGIONAL DEVELOPMENT: This project is part of the first phase of an integrated regional development program for the Prefecture of Evros. Specific project components include: (a) construction of flood protection works, installation of about 75 tubewells, pipes and hydrants and related roads, drains, and power transmission lines, construction of about 285 km. of main and access forestry roads and reforestation of about 3,000 ha.; and the provision of vehicles for extension and veterinary services; (b) extension of the sugarbeet processing capacity of the Hellenic Sugar Industry (HSI) Orestias sugar factory from 3,000 to 6,000 tons of beets per day; (c) construction of about 50 km. of paved connection roads and about 250 km. of gravel rural roads and the supply of road maintenance on all paved roads in Evros; (d) construction and equipping of a technical lycee and vocational secondary school at Didimotichon, and (e) construction of retail markets in three major towns, replacement of polluted water supply sources for ten villages, paving of about 55 km. of community streets and construction of community centers in twelve towns and villages.

Borrower: The Hellenic State.

Terms: $35.0 million equivalent World Bank loan. Term of 15 years with interest at 8.2 percent per annum. Total project cost: $81.0 million equivalent.

Purpose & Benefits: The economic rate of return on this project, including all investment costs, is estimated at about 12 percent. In addition, substantial unquantified benefits are expected from community streets and centers, markets, village water supplies, increased support for extension, veterinary, and research services. The establishment of the project administration and the Evros Special Development Fund and the technical schools will help meet both national and local manpower needs. Although each of the components is viable, the impact of the project as a whole on the economy, incomes and quality of life in Evros—and its significance as a model for similar efforts elsewhere in Greece—is equally as important. These investments complement Greek Government efforts and incentives to encourage private enterprise and are expected to increase economic production by a net $7.3 million equivalent annually. Specifically, the sugar factory expansion will complement the public irrigation program and allow the agricultural potential of the region to be more fully realized, thereby providing farmers with an assured income from a high value cash crop. Forestry development will support present small wood processing industries in Evros, many of which run on short supplies, by providing an additional 17,000 m^2/year of wood. Finally, the infrastructure investments will encourage increased production of sugar beets, corn, melons, and other cash crops.

Date Approved: June 14, 1977 (IBRD)

GUATEMALA

EARTHQUAKE RECONSTRUCTION: These World Bank loans will help finance the following programs: Housing—sites and services and materials credit for about 10,000 housing units to be developed in Guatemala City; materials credits for ten Departmental capitals to help about 8,000 families rebuild their homes; small business credit to building materials producers for housing construction and technical assistance; Education—construction of thirteen primary schools to replace schools destroyed by the earthquake; construction of fourteen primary schools in the sites and services component of the project; and construction of five lower secondary schools to replace schools destroyed; Ports—limited rehabilitation of Puerto Barrios by converting an existing bridge into a two-berth pier; dredging and providing cargo handling equipment; and port organization and feasibility studies for the construction of a dry bulk terminal.

Borrower: Republic of Guatemala.

Terms: $20.0 million equivalent World Bank Third Window loan. Term of 25 years with interest at 4.85 percent per annum. $6.5 million equivalent World Bank loan. Term of 22 years with interest at 8.85 percent per annum. Total project cost: $52.0 million equivalent.

Purpose & Benefits: Total housing damage from the earthquake has been estimated at 258,000 dwelling units affected, of which 58,000 were destroyed in Guatemala City, 12,000 in provincial capitals, and the balance in smaller towns and villages. The sites and services component of this project will support Guatemalan Government efforts to strengthen the National Housing Bank (BANVI) to be an effective intermediary in urban development. The fourteen primary schools to serve 6,720 students (on a double shift basis) will provide educational facilities for children of families from the residential areas to be rebuilt with assistance from the sites and services component of this project. The five lower secondary schools, serving 5,280 students are to replace destroyed schools and will provide modest enrollment increases through the more intensive use of facilities in double shifts. The secondary schools to be built are to use the curriculum developed for schools constructed under the World Bank's previous (Second) Education Project. The rehabilitation of Puerto Barrios should provide sufficient port capacity at relatively low cost for the next three years. Thus, future bulk shipping facilities and the long-term development of Guatemala's posts can be carefully planned. The proposed rehabilitation of Puerto Barrios is the least cost solution and will provide jobs for a large number of port workers who lost employment as a consequence of earthquake damage.

Date Approved: July 13, 1976 (IBRD)

POWER: This power project consists of: (a) construction of a concrete gravity diversion dam and a reservoir on the Aguacapa River; (b) construction of a 12 km. concrete lined power tunnel and a 3.7 m. steel penstock; and (c) construction of a power station with three 30 MW. generating units. In addition, the project includes construction of step-up transformer facilities at the power plant, a switching station downstream from the power plant, and a 23 km. single-circuit transmission line.

Borrower: Instituto Nacional de Electrificacion (INDE). *Guarantor:* Guatemala.

Terms: $55.0 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $111.2 million equivalent.

Purpose & Benefits: This project represents the least-cost solution to the problem of expanding Guatemala's electric power generating capacity, determined after comparison with several possible sequences of conventional, thermal, geothermal and hydroelectric plants and various designs and stages for the Aguacapa site. The rate of return on this investment is estimated at 14.9 percent. This rate of return indicates that electricity prices will, on average, be higher than incremental costs for the system. The actual economic rate of return probably will be higher since the electricity rates used as the measure of benefits do not fully reflect the many indirect benefits to industry, commerce and other large consumers whose production and employment depend on an ample and reliable supply of electric energy. The Government of Guatemala has agreed to take all actions necessary to bring about the economic operation of all generating and transmission facilities in the interconnection system and that further expansion of these facilities will be based on economically justifiable programs.

Date Approved: May 17, 1977 (IBRD)

HAITI

RURAL DEVELOPMENT: The proceeds of this IDA credit will assist in financing the rehabilitation and expansion of three irrigation systems; the rehabilitation and construction of 93.5 km. of feeder and farm access roads; the construction of up to five spring-fed water supply systems for rural potable water supply; the extension of agricultural credit facilities to cooperative groups of small farmers and to individual medium-sized farmers; and various research, marketing and training programs.

Borrower: Republic of Haiti.

Terms: $10.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $13.4 million equivalent.

Purpose & Benefits: Nearly 4,000 rural families will benefit directly from this project with on-farm consump-

HAITI—Continued

tion expected to rise by about 30 percent and average annual farm family cash incomes from agricultural and livestock activities from $60, on average, to about $150 (equivalents). In addition, 26,000 rural families are expected to increase their subsistence level of consumption by up to 20 percent and derive other benefits from better roads and improved agricultural services. Potable water will be supplied to about 3,000 rural families and about 60,000 urban inhabitants will benefit from better health standards and more competitive trading as a consequence of market rehabilitation. At full development (seven years after project inception) incremental production in the project area should be valued at about $2 million equivalent. The risks in the project include problems of coordinating the activities of the various participating agencies, and weaknesses of the Haitian public services which could adversely affect maintenance of project facilities, credit recovery and the continuity of the rural development effort in the project area. To counter the institutional risks, the project will provide substantial technical assistance in training and coordinating activities.

Date Approved: December 28, 1976 (IDA)

HONDURAS

TRANSPORTATION: The proceeds of these World Bank loans will help finance a project comprising: (a) reconstruction of the primary road between Talanga and Juticalpa (about 114 km.); (b) reconstruction of the secondary road between Juticalpa and Catacamas (about 41 km.); (c) purchase of maintenance and workshop equipment, including spare parts and laboratory equipment; and (d) consulting services for preparation of a Highway Master Plan, technical assistance to the General Directorates of Highways and of Highway Maintenance, including an on-the-job training program, and technical assistance to the local road construction industry.

Borrower: Republic of Honduras.

Terms: $28.0 million equivalent World Bank loan. Term of 20 years with interest at 8.7 percent per annum. $7.0 million equivalent World Bank Third Window loan. Term of 25 years with interest at 4.7 percent per annum. Total project cost: $51.2 million equivalent.

Purpose & Benefits: This project involves reconstruction of one of the vital links in the Honduran primary road network which has been developed, for the most part, during the past ten years. It will provide efficient access to one of the major valleys in Honduras as well as to the southern part of the Olancho Forest Reserve. Access from the north coast is not likely to be completed in less than ten years so this project road will be, in effect, the sole outlet for products from this productive area. While the State Forest Corporation (COHDEFOR) has a program under way for managing the Reserve, the development of the Guayape Valley appears to be less certain. The study of this valley, to be undertaken under this project, will ensure that the Government has the necessary data on the potential of the valley so that plans for the investments and institutions needed to realize that potential may be formulated. The economic analysis suggests that reconstruction of the road is both well justified and appropriately timed. Based on an economic life of 20 years and construction periods of four years for the first section and three years for the second section, the economic rate of return for the construction element has been estimated at 15 percent, with a first year return of 13 percent. Separate analysis of the Talanga-Juticalpa road section indicates an economic return of 16 percent, with a first year return of 14 percent. For the Juticalpa-Catacamas section, the economic return is estimated at 11 percent, with a first year return of 9 percent.

Date Approved: November 23, 1976 (IBRD)

TRANSPORTATION: These World Bank Group loans will help finance a port development project comprising: the construction of a 450 m. wharf, a transit shed, warehouse, lumber sheds, office buildings, a maintenance building, a palm oil storage tank and miscellaneous related structures at Puerto Castilla. The project will also cover extensive equipment purchases including wooden pallets, forklifts, tractors and trailers, front-end loaders, trucks, cranes, steel buckets, and pumping equipment for use at various Honduran ports. Technical assistance to be furnished includes engineering and supervision services, harbor studies, and the preparation of a manual detailing procedures and documentation for container operations plus training for Empresa Nacional Portuaria (ENP) staff in port management and operation techniques.

Borrower: Republic of Honduras. Empresa Nacional Portuaria (ENP).

Terms: $7.0 million equivalent World Bank loan. Term of 20 years with interest at 8.5 percent per annum. $5.0 million equivalent World Bank Third Window loan. Term of 24 years with interest at 4.5 percent per annum. $5.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $29.9 million equivalent.

Purpose & Benefits: Traffic projections for Puerto Castilla are based on the Honduran Government program for the export of forestry products (sawn timber, woodchips, and eventually liner board) from the Olancho forestry reserve and of agricultural products (corn, beans, citrus fruit and palm oil) from the Aguan Valley. The estimates of imports are related to projected input needs (machinery, chemicals, fertilizers, petroleum) for these two forestry and agricultural development projects for which major financial commitments have already been made. This port is thus justified primarily as part of the larger package of development investment. Since both the agricultural and forestry development programs have been determined to be economically viable, the analytical problem was to identify the least-cost solution to the port facility question. Starting at a level of 264,000 tons in 1980, total port traffic is expected to increase to 1,049,000 tons by 1983, when the export of woodchips will peak at about 643,000 tons. Following the startup of a pulp and paper mill in 1984, woodchips exports are expected to decline rapidly, to be replaced by a smaller tonnage of liner board (133,000 tons), bringing total port traffic to about 794,000 tons by 1986. These are conservative traffic projections since they include only the reasonably firm traffic related to the forestry and agricultural projects and do not include export traffic in such products as hardwood and sugar from the Aguan Valley and bananas from the Isleta area. The overall rate of return for this port development project is estimated at 25 percent.

Date Approved: April 5, 1977 (IBRD and IDA)

INDIA

TELECOMMUNICATIONS: The proceeds of this World Bank loan will help improve and increase India's domestic telecommunications system capacities over the period 1976 to 1979 through the installation of additional telephone lines and associated facilities, the expansion of trunk line facilities, the extension of service to rural areas and an increase in telex service.

Borrower: India.

Terms: $80.0 million equivalent loan. Term of 23 years with interest at 8.85 percent per annum. Total project cost: $415.0 million equivalent.

Purpose & Benefits: The economic benefits from telecommunications investments stem from the more efficient use of these resources for other sectors of an economy. Productivity is improved, waste avoided, the disadvantages of distance and dispersal of people and productive units reduced, and markets are expanded. While the benefits from developing a telecommunications system are thus substantial, they are difficult to predict in concrete terms. In many cases, gross benefits to callers exceed charges paid. In addition, benefits accrue to recipients of calls. Moreover, when a telecommunications system is extended to new subscribers, benefits to existing subscribers are not reflected in the new connection charges. In India there has been a large waiting list for new connections for many years. As of mid-1976, there were about 280,000 petitioners for service. All of these factors suggest that the benefits from this project are under-represented by simple reference to increased revenues. Given the externalities associated with telecommunications, the discount rate which equalizes the stream of expected revenues attributable to a project tends to be conservative as an estimate for the economic rate of return. This is, in any event, predicted at a minimum of 20 percent for this project.

Date Approved: July 6, 1976 (IBRD)

TRANSPORTATION: This World Bank loan will help finance a program to improve bus services in the Greater Bombay area and aid the Bombay Metropolitan Regional Development Authority (BMRDA) in its initial traffic management and development planning activities. Project components include the improvement and augmentation of the Bombay Electric Supply and Transport Undertaking (BEST) bus fleet through the procurement of 700 buses and related chassis components, construction and equipping three bus depots and a workshop and the extension and re-equipping of other existing depots, the execution of traffic engineering studies to improve bus circulation, and the provision of technical assistance and training to BEST, the Bombay Municipal Corporation (BMC), and to BMRDA.

Borrower: Bombay Metropolitan Region Development Authority. *Guarantor:* India.

Terms: $25.0 million equivalent World Bank loan. Term of 20 years with interest at 8.7 percent per annum. Total project cost: $50.5 million equivalent.

Purpose & Benefits: The bus service improvements to be brought about by this project will help remedy major inadequacies in the Greater Bombay Area public transport system. The project will also support efforts to make better use of present transport resources while longer term mass transport options are being investigated. The major direct beneficiaries will be Greater Bombay area bus commuters, a group composed largely of low- and middle-income earners. Traffic engineering improvements and the reduction of traffic congestion should also benefit other road transportation users including taxis, private cars, commercial vehicles and pedestrians. An evaluation of the major components in this bus service improvement program (dollar equivalents) indicates that: (a) replacement of over-age buses ($15.5 million) will yield an economic rate of return of 40 percent by reducing fleet operating costs and increasing the service availability and use of buses; (b) augmentation of the bus fleet and supporting facilities ($19.5 million) will give an economic rate of return of 27 percent; and, (c) traffic circulation improvements on high-frequency routes ($12.1 million) will yield a 24 percent economic rate of return through the reduction of operating costs. The overall economic return on these bus service improvements is estimated at about 28 percent.

Date Approved: October 26, 1976 (IBRD).

AGRICULTURE: This project is designed to improve the productivity of tree crop cultivation and, consequently, the economic situation of smallholder farmers in Kerala State. It covers financing for new plantings and the rehabilitation of existing coconut groves with systematic intercropping; pepper rehabilitation; cashew development; establishment of seed gardens; and processing of smallholder rubber. Support to smallholders for agricultural development is to be provided mainly in the form of long-term institutional credit and extension services. Other support services in the project include research, technical assistance and training programs.

Borrower: India.

Terms: $30.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $69.0 million equivalent.

Purpose & Benefits: The project this IDA credit will help should permanently improve the income of about 75,000 rural households, most of which are in the poorest segment of India's population. Major benefits are to stem from increased output as a consequence of intensified and improved agricultural practices on 30,000 ha. of existing coconut and 10,000 ha. of pepper rehabilitation, and 5,000 ha. of new coconut plantings. At full production, additional output is expected to be about 200 million coconuts (18,000 tons of coconut oil equivalent), 6,000 tons of pepper, 15,000 tons of milk, 2,000 tons of cocoa, 6,000 tons of cashews and 40,000 tons of other food crops. Rubber processing facilities will yield higher incomes to 50,000 smallholders through the upgrading of the quality of 25,000 tons of rubber. Increased milk production will be enough to provide 75,000 persons with the minimum recommended 210 grams per day. In addition, the project will generate 50,000 man-years of additional employment during the development phase and 13,000 man-years annually thereafter. Increased production of pepper and cashews should add about $12.0 million equivalent to annual foreign exchange earnings by 1990. The economic rates of return are computed to be: 33 percent for coconut rehabilitation without irrigation investments (or 15 percent with irrigation); 46 percent for new coconut planting without irrigation (25 percent with irrigation); 27 percent for pepper rehabilitation investments; 39 percent for cashew development; and 68 percent for rubber processing investment. The weighted average rate of return for the project as a whole is 30 percent.

Date Approved: February 15, 1977 (IDA)

AGRICULTURE: This project is a package of complementary components aimed at achieving early and sustained improvement in agricultural production, particularly of foodgrains, in the State of Orissa. Activities to be financed include the strengthening of the extension service to bring proven agricultural practices to farmers statewide and the strengthening and reorienting of related research programs. The basis will also be laid for longer term improvement of groundwater development through surveys, monitoring and shallow tubewell technology and credit will be provided to improve land transfer and survey systems which will also help land consolidation and enhance farm efficiency. Agricultural statistics and data processing are to be expanded to assist the Government of Orissa (GOO) and the Government of India (GOI) in agricultural planning.

Borrower: India.

Terms: $20.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $40.0 million equivalent.

Purpose & Benefits: The principal benefit from this project will be increased yields as the impact of improved extension and research programs is felt. Small farmers with limited financial resources but excess labor are to be the immediate beneficiaries of project emphasis on more efficient use of existing resources. A calculation has been made of the increase in yields required to achieve an economic rate of return equal to the opportunity cost of capital in India (estimated to be about 12 percent). Only a very small increase (8.0 kg/ha.) in rain-fed rice yields, (currently 800 kg/ha.) would be needed from year seven of the project to generate a 12 percent economic rate of return. Experience with the improved extension methodology being applied in Rajasthan and in Madhya Pradesh suggests, however, that yields can be confidently expected substantially to exceed this modest amount. Other project benefits will include a significant increase in employment, with additional on-farm employment expected to rise to about 55 million man-days by year four and 100 million man-days by year eight of the project. By year eight, total additional on-farm employment will be equivalent to about 400,000 man-years. New jobs are also to be created in farm implement manufacture and distribution, input supply, handling of increased marketable surpluses, and in farm management and agricultural statistics.

Date Approved: February 22, 1977 (IDA)

POWER: This project involves construction of the first 600 MW. of capacity at the Singrauli thermal power station and the provision of ancillary equipment and related works and installation of 400 kV. of transmission facilities to convey the power to bulk supply points. The power station is to be built on the Singrauli coal field at Kota in the State of Uttar Pradesh and is expected to reach 2,000 MW. capacity (five 200 MW. and two 500 MW. generating 2,000 units) by October 1985. The first three 200 MW. units are to be commissioned between October 1981 and October 1982. Principal components of this project are civil works; three 200 MW. turbo-generators; three 680 tons per hour boilers with auxiliaries and ancillary electrical and mechanical equipment; coal transportation and handling equipment; and about 460 circuit kms. of single circuit 400 kV. transmission line.

Borrower: India.

Terms: $150.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $397.0 million equivalent.

Purpose & Benefits: The Singrauli power station offers economies of scale and location at the coal pit-head. Providing hydropower facilities with the same capacity would not only be more expensive but these could not be built and commissioned within the necessary time frame in any event. The Singrauli development is also preferred to the next best alternative of smaller thermal units near power consuming centers—compared with such units, the equalizing rate of return on this project investment is 32 percent. An overall economic factor to be considered is that, in an environment with a long history of power shortages, the value of power to consumers is almost certainly higher than the tariffs they are expected to pay and which were used as the basis for computing project internal rates of return. The calculated rate of return for the project of 10 percent is thus well below the real economic rate of return for this project.

Date Approved: March 1, 1977 (IDA)

URBAN DEVELOPMENT: This project will help develop and promote low-cost solutions to the problem of providing improved services to the urban poor in the Madras metropolitan area. It will also assist in strengthening metropolitan planning and investment programming and budgeting. Specific project elements include: (a) sites and services for about 13,500 families; (b) basic infrastructure services and community facilities in 85 slum areas with a population of about 23,000 families plus open plots to be developed for an additional 7,500 families; (c) sheds, equipment, finance and training to create about 4,000 jobs in small-scale business and about 5,000 jobs in cottage industry; (d) buildings, equipment and training to provide supplementary nutrition, health examinations, immunization, health and nutrition education and functional literacy training for about 17,000 pre-school age children and 20,000 women; (e) measures to rehabilitate the existing water supply and sewerage systems; (f) construction of about 12 km. of an Inner Ring Road and pedestrian walkways, bicycle tracks and other road and traffic improvements and traffic engineering measures; (g) replacement of 285 over-age buses and construction of depots, terminals and passenger shelters; and (h) technical assistance in development planning and management.

Borrower: India.

Terms: $24.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $52.0 million equivalent.

Purpose & Benefits: The economic rate of return for this project is estimated at an average of about 21 percent for those components with quantifiable benefits (55 percent of total project cost). Numerous steps are to be taken under the project to initiate financially sustainable programs responsive to the needs of Madras' low-income population. By shifting the emphasis from slum clearance ($1,100 equivalent per household) to low-cost slum improvement ($145 equivalent per household), all slum areas in Madras should be improved by 1985. In the housing sector, the project will provide shelter and services affordable by households at the 10th percentile of the Madras income distribution scale. Housing unit costs have been reduced by about 75 percent (compared to present programs) through more efficient design and reliance on self-help. Low-cost job creation and health, nutrition and family planning services also form parts of the slum improvement and sites and services programs. In the water supply and sewerage sectors, the project will prevent further deterioration of an already critical situation by providing short-term physical improvements at low cost. In each sector, the project includes specific measures to ensure that future revenues from beneficiaries are sufficient to permit adequate operation, maintenance and replacement of facilities.

Date Approved: March 8, 1977 (IDA)

AGRICULTURE: This project involves the consolidation and strengthening of West Bengal's reorganized agricultural extension services and will help upgrade and develop adaptive research facilities with the aim of achieving early and sustained improvements in foodgrain production. Project components include: (a) the provision of housing for agricultural extension staff, plus offices and transportation to improve extension service mobility; (b) improvement of staff training centers by adding classrooms, teaching staff, equipment and vehicles; (c) the provision of staff, equipment and funds for studies to evaluate and monitor project progress and impact; and, (d) providing 300 training fellowships in extension work and 130 research training fellowships.

Borrower: India.

Terms: $12.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $28.1 million equivalent.

Purpose & Benefits: The main benefit of this project will be an increase of crop yields with the primary beneficiaries being small farmers, including tenants and sharecroppers, of limited financial resources but excess labor capacity. The expected benefits of improved agricultural practices, which will also require other inputs, cannot be attributed solely to extension and research services although there is no doubt but that improvement in the efficiency of resource use as a consequence of this project will generate a high overall rate of return, in the neighborhood, perhaps, of as much as 50 percent. In the IDA-financed Chambal and Rajasthan Development Projects provisional data indicate that over a three-year period yields of rice increased by an average of 60 percent, wheat by 80 percent and mustard and gram more than doubled as a result of improved extension services. While these latter are largely irrigated areas, they are nonetheless indicative of the magnitude of possible response in extension service projects of this type.

Date Approved: March 22, 1977 (IDA)

FISHERIES: This project is designed to develop the Gujarat fishing industry. Components of the project will include: (a) improvement of the fishing harbors at Mangrol and Veraval to permit the handling of more mechanized fishing vessels and provide better weather protection; (b) improvement of shore facilities and services at these two ports to support the existing fleet and subsequent fleet expansion; (c) provision of credit for the establishment of fish processing, freezing, and ice plants; (d) constructing and equipping 270 14.8 meter mechanized fishing vessels; (e) assistance to fishermen by providing credit to purchase fishing craft and equipment; and (f) assistance in marketing and fisheries organization.

Borrower: India.

Terms: $14.0 million equivalent World Bank Third Window loan. Term of 24 years with interest at 4.5 percent per annum. $4.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $38.0 million equivalent.

Purpose & Benefits: The economic benefits of this project will include: (a) an increase in the fish catch by nearly 45,000 tons annually; and (b) the enhancement of the economic value of present and incremental catches through improved handling and marketing facilities. In addition, the project will help ease important production and export constraints and provide valuable experience for application elsewhere in India. Financial rates of return for investments in shore facilities are estimated at about 36 percent for the ice plant, over 55 percent for freezing plants, and about 23 percent for the fish meal plant. These returns are expected to be sufficient to attract investor interest in leases in the port terminal areas. For mechanized fishing vessels and canoes the financial rates of return are estimated at about 53 percent and 30 percent respectively, on the basis of an annual operating income, after payment of wages, of approximately $9,000 equivalent for the larger vessels and $950 equivalent for fishing canoes. The economic rate of return for the project as a whole is estimated at 24 percent. It is expected that the project will also provide new employment for about 3,500 fishermen on trawlers, canoes and in supporting industry services.

Date Approved: March 31, 1977 (IBRD and IDA)

AGRICULTURE: This IDA credit will help finance the consolidation and strengthening of Madhya Pradesh State agricultural extension services and help upgrade and develop adaptive research facilities with the objective of achieving early and sustained improvements in foodgrain production. The project components include: reorganization and strengthening of agricultural extension through the provision of additional staff, training facilities, housing, offices, equipment and transportation; upgrading and reorienting agricultural research at five regional research stations and seven sub-stations, and the provision of staff and equipment to evaluate and monitor project progress.

Borrower: India, Madhya Pradesh State.

Terms: $10.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $20.9 million equivalent.

Purpose & Benefits: The principal benefit from this project will be an increase in crop yields as the impact of the new extension and research system takes effect. Small farmers with limited financial resources but excess labor are to be the immediate beneficiaries because of the project's emphasis on the more efficient use of existing resources. Precise benefits from this type of project are difficult to compute since improved agricultural practices, which also require other inputs, cannot be attributed solely to extension and research. Moreover, there is not enough experience in Madhya Pradesh State as yet to estimate acceptance rates. There is no doubt, however, that the improvement in the efficiency of resource use which will stem from this project will generate high rates of return. The principal economic benefit of the project is to be an increase in agricultural production, particularly foodgrains. It is reasonable to expect that by year 7 crop yields over at least 50 percent of all cropped land will increase by 25 kg. per ha., giving an economic rate of return of 50 percent. The performance of improved extension services elsewhere in India has been satisfactory and, since the best farmers in Madhya Pradesh State already obtain nearly twice current national average yields, expectations of a high rate of return on this project are fully justified.

Date Approved: May 12, 1977 (IDA)

AGRICULTURE: This credit will help support a two-year program of the Agricultural Refinance and Development Corporation (ARDC) for lending to farmers plus an intensive training effort focused primarily on developing the staff of Land Development Banks (LDB). Loans under the project will be used mostly for minor irrigation projects but credits for developing other on-farm activities such as dairying, poultry raising, and sericulture are also to be provided.

Borrower: India.

Terms: $200.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum.

Purpose & Benefits: The economic benefits from this project will take the form of increased agricultural production for domestic consumption and export. At full project development (1984) the annual value of increased production will be about $367 million equivalent, in 1976 prices. Calculations indicate that the overall economic rate of return for the project will be about 32 percent. In addition to the realization of substantial benefits from productive on-farm investments, the project is also designed to build stronger institutions. Strengthening of the ARDC's technical units and improvements in the Corporation's monitoring and evaluation systems are expected to lead to better program preparation, appraisal and monitoring. Strengthening the LDB's through intensive staff training will have a similar impact. Measures to improve performance of weak LDB's in poorer areas will increase the availability of funds for investments and contribute to a more equitable regional distribution of productive assets. The number of project beneficiaries is estimated at about 1 million farmers. At least 50 percent of the credit will be made available to small farmers and about 25 percent is expected to be used in the less developed northeastern States of India. Incremental annual employment generated by project investment is estimated at about 175 million man-days. Much of this additional labor will be supplied by unemployed or under-employed members of beneficiary families although a significant role is to be played by hired laborers—many of them landless members of the poorest segments of India's population.

Date Approved: May 24, 1977 (IDA)

IRRIGATION: This IDA credit will help finance a project to minimize water losses during conveyance and operations by the rehabilitation and modernization of the existing Periyar Vaigai irrigation system. Water savings will be used to introduce double irrigation in areas presently growing only one irrigated crop per year, and/or to bring new areas, presently rainfed, under irrigation for the first time. The project consists of: (a) lining all irrigation canals down to the 10 ha. outlets; (b) building a 32 km. lined link canal; (c) rehabilitating existing structures and constructing additional control structures and outlets; and (d) technical assistance.

Borrower: India (State of Taml Nadu).

Terms: $23.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $45.6 million equivalent.

Purpose & Benefits: This project will permit expansion of an irrigation system which already uses all available surface water supplies in an environment where no additional surface water and only limited groundwater resources remain. Groundwater development as an alternative source for additional irrigation water is technically feasible, but would be much more costly than canal lining. Taking into account the difficulty of reaching small farmers with a groundwater development program, canal lining is clearly the more attractive alternative. Water savings through the project are expected to make an estimated 160 million m^3 of additional water available at farm outlets. Under the project, the area served is also to be extended to include about 9,000 ha. of heretofore rainfed land. In addition to this, the expected water savings will make it possible either to bring an additional 15,800 ha. of rainfed land under irrigation or to convert 18,800 ha. of single-irrigated land into double-irrigated land—or some combination of these two possibilities. Using water further to extend the irrigated area will lead to a wider improved income distribution and, from this point of view, is the more attractive choice. Since this would require additional investment in the distribution network, the economic rate of return—about 17 percent—would be lower than the economic rate of return for double irrigation (about 23 percent). The project will increase paddy production by about 60,000 tons, resulting in $13 million equivalent of value-added to the local economy and in net foreign exchange savings of $9.6 million equivalent annually.

Date Approved: June 2, 1977 (IDA)

AGRICULTURE: This project will help consolidate and strengthen agricultural extension services in Assam, covering 97 percent of the State's population and a total cropped area of 2.7 million ha. The project will also develop and upgrade adaptive research, and lay the foundations for longer-term improvements in groundwater development. Specific project components include: (a) completion of the reorganization and strengthening of Assam's agricultural extension services; (b) development and strengthening adaptive research; (c) strengthening Assam's Irrigation Development Program; and (d) creation of project monitoring and evaluation facilities.

Borrower: India (State of Assam).

Terms: $8.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $16.4 million equivalent.

Purpose & Benefits: The principal benefit to be derived from this project is an increase in yields as the impact of the improved extension and research systems becomes felt. Experience with other IDA-financed projects of this type in India indicates that, within two years from the introduction of new methodolgy, more than one half of the farm families can be expected to adopt some, or most, of the extension service recommendations. It is estimated that the project will directly benefit about 200,000 farmers and, through them, at least one million of the 1.9 million farm families in the project area. Small farmers with limited financial resources but excess labor are to be primary beneficiaries of the project emphasis on the more efficient use of existing resources rather than the use of purchased inputs which are frequently too expensive for small and marginal farmers. Attributing precise levels of benefits to this type of project is not feasible since the benefits from improved agricultural practices, which also require some other, additional, inputs, cannot be attributed solely to improved extension and research services. There is no doubt, however, but that the substantial improvement in the efficiency of utilization of resources which will flow from this project will generate a relatively high rate of return. It is reasonable to expect that by year 7 production of rice will have increased by about 43,000 tons statewide, suggesting an economic rate of return of about 50 percent.

Date Approved: June 28, 1977 (IDA)

INDUSTRY: This project will help finance some of the facilities required to produce up to 140,000 barrels per day of oil and 2.2 million cu. meters per day of natural gas from the Bombay High and Bassein oil and gas fields west of Bombay in the Arabian Sea. The project also includes construction of facilities to process, transport, store and deliver to users the oil and natural gas expected to be available when these fields are in full production.

Borrower: India (Oil and Natural Gas Commission (ONGC)).

Terms: $150.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $571.0 million equivalent.

Purpose & Benefits: Using prices set by the Indian Government for gas (comparable to international prices) and the current international price of $13/barrel for crude oil, the Bombay High Development Program yields an economic rate of return of 66 percent. Although the risks normally associated with hydrocarbon development projects are compounded for offshore ventures such as this by weather conditions, the industry has developed techniques and technologies over the years which reduce risks to acceptable levels. The technical solutions selected by ONGC have proven reliable elsewhere and ONGC consultants and contractors have considerable experience in the design and construction of offshore and onshore facilities. ONGC staff is, furthermore, well qualified and experienced in all the facets of oil and gas production, processing and utilization. ONGC has taken a conservative approach to the evaluation of these gas and oil fields and has used experienced consultants to assess both the reserves and the production mechanisms. The evaluations are consistent and indicate that the fields will eventually produce more than originally anticipated. Continuous monitoring by ONGC, assisted by reservoir engineering consultants, of the behavior of the deposits will provide sufficient warning of any problems for ONGC to take remedial actions.

Date Approved: June 30, 1977 (IBRD)

INDONESIA

RURAL DEVELOPMENT: Major components of the project this World Bank loan will help finance include: the development of a new settlement at Baturaja and the upgrading of the settlement at Way Abung. Specific elements involve building village centers with settler houses; providing water supply and sanitation facilities; equipping and staffing health and school facilities in each village; constructing all-weather roads, village roads and farm tracks; block planting of rubber; the distribution of cattle, fertilizer inputs and seeds to support food production; and the establishment and staffing of agricultural credit, extension and cooperative services.

Borrower: Republic of Indonesia.

Terms: $30.0 million equivalent. Term of 25 years with interest at 8.85 percent per annum. Total project cost: 56.0 million equivalent.

Purpose & Benefits: Net income from food crops, 1 ha. of rubber and off-farm employment by a new settler under this project at Baturaja is expected to increase rapidly from $492 equivalent in year two to $861 equivalent in year ten, with a more gradual increase to $1014 equivalent by year fifteen leveling off at $1150 equivalent. An additional hectare of rubber planted by the settler using available long-term credit, or his own resources, will provide additional income to assist him in bridging the replanting period. The rehabilitation of existing settlements at Way Abung will improve prevailing farm incomes to a net annual level of about $970 equivalent at full project development (years 14–29). While there is to be no direct cost recovery from settlers, the Indonesian Government will receive revenues from land taxes paid and from the Rubber Export Tax. At full project development (1985–1995) this tax revenue should amount to $240 equivalent and $60 equivalent per year per settler family in Baturaja and Way Abung, respectively. The economic rate of return for the project is estimated at between 11 and 12 percent for the new settlement at Baturaja (with a settlement cost per family of $5,000 equivalent and a total investment cost of $22.5 million equivalent). The economic rate of return for upgrading the settlement at Way Abung (at a cost per family of $1,520 equivalent and a total investment of $7.6 million equivalent) is about 19 percent. The weighted average rate of return for the project as a whole is estimated at about 13.5 percent.

Date Approved: July 13, 1976 (IBRD)

URBAN DEVELOPMENT: This project comprises a program of public works in Jakarta and Surabaya for the improvement of low-income neighborhoods over the three-year period 1977 to 1979. Components of the project are: (a) construction of paved footpaths, roads, drainage, water supply, sanitation, primary schools and small health clinics; (b) a pilot health program to train community health workers in preventive medicine and basic nutrition; (c) equipment for schools and health clinics; and (d) technical assistance for the design of a national Kampung Improvement Program, and supervision of project execution.

Borrower: Republic of Indonesia.

Terms: $52.5 million equivalent World Bank loan. Term of 20 years with interest at 8.7 percent per annum. Total project cost: $104.8 million equivalent.

Purpose & Benefits: This project will help improve living conditions for more than 20 percent of Jakarta's population (about 1.2 million people) and about 9.5 percent of Surabaya's population (200,000 people). In the densely crowded, unserviced urban kampungs of Indonesia, open spaces and canals are the principal areas used for disposal of human wastes. Stagnant water, the lack of footpaths and the absence of safe supplies of drinking water constitute ever-present health hazards with consequent high levels of mortality and debilitating diseases. Productivity, which is directly related to health, is correspondingly low. Project investments in community and individual human waste disposal facilities, improved storm drainage channels, community health centers, and a less contaminated water supply are expected to lead to improved health and living conditions in Jakarta and Surabaya. With this infrastructure and the complementary provision of health/nutrition programs and educational facilities, basic labor productivity can be expected to increase. The economic rate of return for the Jakarta component of the project is 54 percent and for the Surabaya component, more than 100 percent. The weighted economic rate of return for the project as a whole is 59 percent.

Date Approved: October 26, 1976 (IBRD).

PORTS: This loan will help finance a project designed to meet anticipated traffic growth at Tanjung Priok Port and to provide, in particular, adequate facilities for handling containerized cargo. Components include ongoing government-financed construction in Basin III (East), the provision of back-up facilities, container handling and other equipment in Basin III, 545 m. of new general cargo berths for the regional trade, mechanical cargo handling equipment, improvements in land access to the port, the construction of about 500 houses and related services to replace houses demolished for the Phase II extension of the port, and consulting services and technical assistance.

Borrower: Republic of Indonesia.

Terms: $32.0 million equivalent. Term of 20 years with interest at 8.7 percent per annum. Total project cost: $79.3 million equivalent.

Purpose & Benefits: Tanjung Priok is Indonesia's largest general cargo port, serving not only West Java but also performing important distribution functions for imported consumer and industrial goods destined to other islands of the archipelago. This project will help develop facilities for handling an increasing volume of containerized general cargo, thereby reducing the turnaround time for container ships and encouraging the use of larger and more efficient ships. These facilities are to be of substantially lower capital cost than comparable break-bulk facilities. If this project were not carried out, heavy costs could be incurred and, ultimately, an upper limit would be effectively set on the potential for growth in Indonesia's external and inter-island trade. This, in turn, would have a substantial adverse impact on the economy of the Jakarta metropolitan area and would threaten imported food and other essential supplies for West Java. The economic costs of such a situation would be great. As a conservative measure, the project evaluation computes the additional ship waiting-time which would result in the absence of this project. The expected economic rate of return calculated on this basis is 18 percent.

Date Approved: November 2, 1976 (IBRD)

INTERMEDIATE CREDIT INSTITUTION: The Private Development Finance Company of Indonesia (PDFCI) is predominantly a private sector institution. Of its paid-in share capital of about $6 million equivalent, 60 percent is owned by Indonesian shareholders (including Bank Indonesia) and the balance by the IFC and eight foreign commercial banks. In addition to replenishing PDFCI's foreign exchange resources, this loan will further strengthen PDFCI's efforts to become an efficient and innovative financial intermediary. PDFCI is expected to make a significant qualitative contribution to the Indonesia financial system—a basic objective underlying the 1973 decision by the Government and the World Bank Group to create PDFCI.

Borrower: Republic of Indonesia.

Terms: $15.0 million equivalent World Bank loan. Term of 15 years with interest at 8.5 percent per annum.

Purpose & Benefits: As of June 30, 1976, PDFCI had approved 14 loans and 4 equity investments for 14 projects. The projects covered a fairly broad range of industrial activities, including agro-industries and services (tea plantations, cassava pelletizing, tile manufacturing and hotels) and represented aggregate fixed investment costs of Rp 22.6 million, including PDFCI's financing of Rp 5,741 million ($13.8 million equivalent) of which Rp 343 million represented equity investments. The additional direct employment generated by the projects approved by PDFCI is estimated at about 3,400 jobs at an average investment cost of $16,000 equivalent per new job. The estimated economic rates of return on these projects are satisfactory, ranging from 14 percent to 42 percent. As of June 30, 1976, PDFCI's available domestic currency resources totalled Rp 5.129 billion, or enough to cover projected commitments until mid-1978. Its foreign currency resource position was, however, much tighter. For its term lending PDFCI plans to commit about $75 million in foreign exchange through December 31, 1980, of which $15 million will derive from this World Bank loan. The balance is expected to be obtained from other external sources, which may include IFC, KfW and loan syndication (with the help of IFC). It is estimated that this Bank loan will cover PDFCI's foreign exchange requirements, on a commitments basis, until the end of 1978.

Date Approved: January 25, 1977 (IBRD)

POWER: This World Bank loan will help finance: (a) construction of two 200 MW. units at the Muara Karang thermal power generating plant; (b) engineering and design, including preparation and evaluation of bids, for a third 200 MW. unit at the Semarang Harbor Steam Electric Station; and (c) the provision of engineering services related to the interconnection of the Java System including detailed design and preparation of bidding documents for the first phase of the interconnection program.

Borrower: Republic of Indonesia.

Terms: $116.0 million equivalent. Term of 20 years with interest at 8.5 percent per annum. Total project cost: $241.8 million equivalent.

Purpose & Benefits: This project is a component of a vital program designed to provide urgently needed base load generating capacity on the Island of Java. When the Muara Karang units are commissioned, firm capacity will be about 2,000 MW.—sufficient to meet Javanese power demand until about 1982. The power expansion program, based essentially on the lower load forecasts of the Java System Development Study, indicates that the interconnected Java power network will eventually consist of 38 percent steam, 35 percent gas turbine, and 27 percent hydropower, plus a small contribution by diesel sets. This relatively heavy dependence on gas turbines, which consume more and costlier fuel than large steam units, reinforces the urgent need for more base load steam power generating capacity. The two new Muara Karang units will serve this function and can be placed in service about four years before any hydro alternative. New hydro-electric projects cannot, in any case, be commissioned in time to meet the growth of demand on Java by 1981–82. Furthermore, the generation scheme selected is more economical than the best thermal alternative involving gas turbines. Studies conclude that the installation of the new Muara Karang units is the next step in the least-cost sequence. Both of these units are expected to be in service by 1981–82, assuming actual load growth follows demand forecasts.

Date Approved: February 1, 1977 (IBRD)

NUTRITION: This World Bank loan will help finance a project to assist the Indonesian Government as follows: (a) strengthening the Center for Research and Development in Nutrition, the Food Technology Development Center, and the nutrition-related units of the Ministries of Health, Education and Agriculture; (b) direct nutrition action programs, including an integrated pilot project in seven rural districts combining nutrition, education, agricultural and health activities with selective food supplementation for vulnerable target groups; (c) testing of alternative methods of nutrition education, and expanding the training facilities and program of the Academy of Nutrition in Jakarta and of agricultural training centers and secondary agricultural schools; (d) preparation of a national food and nutrition program based on the results of this project.

Borrower: Republic of Indonesia.

Terms: $13.0 million equivalent. Term of 20 years with interest at 8.5 percent per annum. Total project cost: $26.0 million equivalent.

Purpose & Benefits: This project will strengthen Indonesian staff and institutional capacities to analyze national nutrition problems through research and development and pilot operations designed to test the feasibility and effectiveness of various approaches to these problems and to formulate and subsequently to execute a large-scale action program to cope with the country's nutrition difficulties. Over the longer run, the national action program to improve nutrition, which this project will help initiate, should result in optimizing food resource use, increasing the quality and productivity of the Indonesian work force and improving utilization of the education system. The higher rate of survival for children will also probably lead to a better atmosphere for effective family planning campaigns and may eventually assist in reducing family size.

Date Approved: March 1, 1977 (IBRD)

EDUCATION: This teacher training project will provide for: (a) selection and training of a professional leadership team to implement the project; (b) revision of teacher training programs and development and distribution of new instructional materials; (c) construction and equipping specialized facilities at primary and secondary teacher training colleges and institutes and equipping additional primary teacher training institutes; and (d) retraining about 7,000 teacher educators in new curricula and teaching methods.

Borrower: Republic of Indonesia.

Terms: $19.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $42.8 million equivalent.

Purpose & Benefits: The basic objective of this project is to improve the quality of instruction in primary and secondary schools through the use of better trained teachers. The content and methods of teacher training are to be reformed and improved, training programs are to be adjusted to correspond more closely with the skills required for classroom instruction, and textbooks and teacher guides covering 40 subjects are to be developed and produced in the national language and distributed to 200 teacher training institutions. In-service training will also be provided for about 7,000 teacher educators, representing more than 60 percent of all teacher education staff. Physical facilities to be financed under the project (libraries, laboratories, workshops and demonstration rooms) will lead to better academic preparation and the acquisition of improved teaching methods. Between 1980 and 1985 it is expected that about 80,000 primary, and 23,000 secondary, teachers will have graduated from the teacher education institutions involved and these teachers will be educating about 2.8 and 0.5 million students at primary and secondary levels, respectively, in 1985. The project, together with other improvements envisioned, will make possible primary and secondary school student achievement substantially above current levels. It will also support Government programs to rationalize the primary teacher training institute system, reducing the total number from 205 to 126 and increasing average enrollment, thereby improving quality and reducing unit costs.

Date Approved: May 26, 1977 (IBRD)

IRRIGATION: Major components of this project include: (a) rehabilitation of 75,000 ha. in the Madiun irrigation system in East Java, including introduction of tertiary systems on 30,000 ha.; (b) construction of flood control and drainage works and inspection roads on 5,700 ha. of low-lying coastal land in West Java; and (c) establishment of a 2,800 ha. groundwater pilot project in the Madiun-Solo area. The project also provides for consultant services, training programs, centralized records and retrieval systems, large-scale mapping, and the procurement of vehicles and related equipment.

Borrower: Republic of Indonesia.

Terms: $63.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $118.0 million equivalent.

Purpose & Benefits: This project is expected to lead to an increase of crop yields and production on 83,500 ha. to the direct benefit of some 167,000 farm families (about 1.0 million people) and, indirectly, by providing additional employment opportunities to some 49,000

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landless laborer families (about 294,000 people). After project completion, the increase in paddy production is expected to be about 93,000 tons annually, for net foreign exchange savings of about $26 million equivalent per year. The economic rates of return are estimated to range from 13 percent to 21 percent for the several project components, with an overall weighted economic rate of return of 20 percent. Most of the beneficiaries of the project will be small farmers and sharecroppers. An estimated 85 percent of project area farm families currently have per capita incomes at, or below, the estimated absolute poverty level of $95 equivalent (1975 prices). At full development, the project will increase this group's income on average by 40 percent, thereby raising above the absolute poverty level (although still below the 1975 Indonesian per capita GNP of $210 equivalent) the incomes of one-fifth to one-fourth of the farmers in the group. The project will also benefit the landless labor force by creating a demand for an additional 4.9 million man-days of farm labor per year.

Date Approved: May 26, 1977 (IBRD)

IRRIGATION: Major components of this project are: (a) completion of the rehabilitation and improvement of irrigation and flood control and drainage works of the 30,000 ha. Semarang-Demak-Kudus (SEDEKU) irrigation system in Central Java; (b) construction of the initial stage (3,500 ha.) of the 20,000 ha. Sungai Dareh-Sitiung irrigation system in West Sumatra and execution of a feasibility study for the remaining 16,500 ha.; and (c) studies, surveys, investigations and mapping of nine small- and medium-sized irrigation projects in Java, Sumatra and Sulawesi.

Borrower: Republic of Indonesia.

Terms: $35.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $64.0 million equivalent.

Purpose & Benefits: By providing improved water control distribution and drainage, this project will increase crop yields and production on a total of 33,500 ha. at SEDEKU and Sungai Dareh-Sitiung. The project will directly benefit some 64,000 farm families (about 350,000 people) and, by providing new employment opportunities, some 40,000 landless laborers' families. At full project development (about six years) the annual increase in paddy production is expected to be about 81,600 tons with an added 1,000 tons of soybeans as well. Annual net foreign exchange savings are expected to amount to about $17 million equivalent. The weighted economic rate of return for the project is estimated to be 17 percent. The majority of the beneficiaries of the project will be small farmers and sharecroppers. At full project development (1986), per capita farm income at SEDEKU will increase by about 50 percent and at Sungai Dareh-Sitiung by about 190 percent. An estimated 90 percent of project area farm families presently have per capita incomes at or below the estimated absolute poverty level of $95 equivalent (1975 prices). At full agricultural development, about one-fifth of the farmers in the group will move above the absolute poverty level but still have average incomes below the 1975 Indonesian per capita GNP of $210 equivalent. The project will benefit the landless labor force by creating demand for an additional 2.6 million man-days of farm labor per year.

Date Approved: May 26, 1977 (IBRD)

INTERMEDIATE CREDIT INSTITUTION: This World Bank loan constitutes basically a line of credit for financing specific priority development projects in Indonesia.

Borrower: Republic of Indonesia (Bank Pembangunan Indonesia (BAPINDO)).

Terms: $40.0 million equivalent World Bank loan. Term of 15 years with interest at 8.2 percent per annum.

Purpose & Benefits: In addition to helping to replenish BAPINDO's foreign exchange resources, this loan will contribute to the sound development of Indonesian industry by providing finance on suitable terms. Technical assistance, also to be provided, will further strengthen BAPINDO's organization and management and improve its operations—a process which started with the first World Bank loan in 1972. Despite past progress, BAPINDO still needs assistance in becoming an efficient and innovative financial intermediary. Within the Indonesian financial system, BAPINDO has primary responsibility for assisting the industrial sector. A strong and viable BAPINDO is vital to the sound development of Indonesian public and private industry. As the predominant industrial finance institution in Indonesia, BAPINDO is also the major channel for World Bank funds to the industrial sector. BAPINDO has an adequate appraisal capability and is a suitable allocator of World Bank loan resources. As in the case of previous World Bank Group credits and loans to BAPINDO and the Private Development Finance Company of Indonesia (PDFCI), this loan will be made to the Government for re-lending to BAPINDO—the proceeds of the loan are to be made available by the Government to BAPINDO under a subsidiary loan agreement. BAPINDO will pay interest at the rate of 11 percent per annum to the Government and will re-lend these funds at 15 percent per annum. This four percentage point spread is deemed adequate. (The Government of Indonesia is to assume the foreign exchange risk.)

Date Approved: May 31, 1977 (IBRD)

POPULATION: Major components of the project this World Bank loan will help finance are: (a) provision of equipped vehicles to enable family planning program staff to offer services to population groups who cannot easily avail themselves of services provided by static service outlets; (b) construction and equipment of facilities for the National Family Planning Coordination Board's (NFPCB) Bureau of Education and Training in Jakarta, and provincial training centers and offices in ten provinces outside Java and Bali; and (c) research studies aimed at introducing a pilot community incentive scheme to promote family planning in economically underdeveloped regions and at testing the feasibility of providing raw materials for local contraceptive production using botanical material available in Indonesia.

Borrower: Republic of Indonesia.

Terms: $24.5 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $60.0 million equivalent.

Purpose & Benefits: By providing support for the strengthening and expansion of Indonesia's national family planning training program, this project will lead to improved program management and supervision, enhanced professional and technical skills, an expanded number of trained Village Contraceptive Distribution Centers (VCDC), more volunteer workers, and greater awareness among community officials and leaders of the need for commitment to the family planning concept. The linking of maternal and child health services with family planning activities will contribute to a reduction in infant mortality which, in the long run, should result in a decline of fertility. Project support for the population education program will result in greater awareness of population issues among young people and this awareness should, over the longer term, facilitate a more ready response to family planning motivation work. By providing data and information on possible linkages between improved socio-economic conditions and fertility, the pilot community incentive scheme will be of great value to the program planning staff. These results should provide insights into the ways and means of achieving the strategy objectives of transferring to the community and individuals the sense of urgent commitment to family planning that now exists at the higher levels of government development programs. The oral contraceptive raw materials study will not only provide the Government with needed information to support its policy of establishing a local manufacturing capability, but will also directly benefit the national program by providing a core of professionals with training in pharmaceutical work related to oral contraceptive research and production.

Date Approved: June 30, 1977 (IBRD)

IVORY COAST

URBAN DEVELOPMENT: This project is to be implemented during the period 1977 to 1979 and consists of three major components: (a) transportation: construction of the priority western section (8.6 km.) of the East-West Highway and traffic management measures in the central business district of Abidjan; (b) shelter: slum upgrading and sites and services programs for about 200,000 inhabitants including primary schools, health centers, and community facilities at six sites totaling 312 ha. in Abidjan and 60 ha. in San Pedro, a low-cost housing program in Abidjan, a line of credit for small loans for the purchase of construction materials and the acquisition of lots, and construction of two trunk sewers to serve Abidjan project sites and other neighborhoods; and (c) technical assistance: support to the Ministry of Public Works for staffing a Traffic Bureau, support to the Ministry of Construction and Urbanism to formulate project and program responses to changing shelter sector policies, and to carry out a Ten-Year Development Study and develop a public investment program for Abidjan, and support to the Banque Nationale pour l'Epargne et le Credit (BNEC) for staff development and training.

Borrower: Republic of the Ivory Coast.

Terms: $30.0 million equivalent World Bank loan. Term of 20 years with interest at 8.7 percent per annum. $14.0 million equivalent World Bank Third Window loan. Term of 25 years with interest at 4.7 percent per annum. Total project cost: $123.0 million equivalent.

Purpose & Benefits: This project is aimed at developing a more efficient land use strategy and more realistic housing standards for Abidjan City. The rate of return on the transportation component of the project, which accounts for about 41 percent of total costs, calculated on the basis of estimated benefits in the first year of full operation (1980) is expected to be 48 percent on the basis of savings in operating costs alone. Since traffic flows will grow, this rate of return is a minimum estimate of these project benefits. The project will stimulate significant improvements in bus service to the benefit of bus riders who fall mainly in the lower income groups. The economic rate of return on the shelter component, which accounts for about 55 percent of project costs, is estimated to be at least 30 percent. These benefits will redound to about 200,000 persons in the form of more secure tenure and improved environment. Benefits would also arise from the increased productivity of healthier people as well as from the specific employment-creating aspects of the project. A weighted average economic return of all project components for which benefits can be quantified is estimated to be 43 percent.

Date Approved: December 14, 1976 (IBRD)

AGRICULTURE: This project consists of: (a) preparing about 18,500 ha. for the plantation of oil palm and coconut estates; (b) establishing 8,000 ha. of oil palm and 7,500 ha. of coconut estates; (c) providing infrastructure for these estates including feeder roads, housing, social, medical and administrative buildings, storage sheds, vehicles and equipment; (d) establishing an outgrower program covering about 2,000 ha. of coconut and 500 ha. of oil palm plantings on land cleared by farmers; (e) providing farmers with loans, extension services and infrastructure; and (f) providing a Project Directorate, including offices, housing, vehicles, equipment and operating funds.

Borrower: Societe pour le Developpement et l'Exploitation due Palmier a Huile (SODEPALM). *Guarantor:* Ivory Coast.

Terms: $20.0 million equivalent World Bank loan. Term of 20 years with interest at 8.5 percent per annum. Total project cost: $36.2 million equivalent.

Purpose & Benefits: Primary benefits of this project will be expanded production of palm oil and kernels, copra and coconut charcoal and net annual foreign exchange earnings from the project are expected to reach about $40.0 million equivalent by 1986. In addition, the project will create the social and physical infrastructure needed to settle new farmers in the relatively undeveloped Southwest region of the Ivory Coast. The project is expected to create about 1,600 full-time jobs for estate-laborers as well as increase considerably the incomes of about 600 local farmers. In the economic analysis of this project, output values were based on projected world prices, labor cost at estimated efficiency wages, and non-labor costs at market cost net of taxes (in 1975 terms). The computed economic rates of return are 17 percent for the whole project, 16.5 percent for the oil palm and coconut estates (70 percent of total project costs), and 30 percent and 23 percent for the oil palm and coconut outgrower programs, respectively.

Date Approved: March 22, 1977 (IBRD)

JAMAICA

AGRICULTURE: This rural development project will support Jamaican Government programs to strengthen the rural economy, improve rural living conditions, reduce rural/urban income disparities and curb rural to urban area migration. The project is to be located principally in the Western Region where the poverty problem is especially pronounced. The program will concentrate on removing key constraints to rural development not dealt with by other Government programs. That portion of the project relating to the reorganization of the Ministry of Agriculture will have national impact.

Borrower: Jamaica (Ministry of Agriculture).

Terms: $15.0 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $31.4 million equivalent.

Purpose & Benefits: The direct beneficiaries of the settlement component of this project will be 1,400 families which are to receive full-time agricultural employment at satisfactory income levels. At the present time, it is estimated that the average of these families' income is about $550 equivalent. Annual family income from farm operations after resettlement is expected to reach an average of about $3,300 equivalent after five years and about $7,700 equivalent at full project development in fifteen years. The unweighted average financial rate of return on this program is estimated to be 37 percent. Excluding input and price subsidies, the average rate of return will be about 20 percent. The direct economic benefits from the settlement component of this project will consist of additional agricultural production valued at $7.0 million equivalent at full development. The economic rate of return for the settlement component of the project is estimated to be about 19 percent. In addition to quantifiable benefits, implementation of the settlement program will assist in the establishment of suitable administrative procedures for other settlement efforts which is the Jamaican Government's principal approach to correcting socially and economically incompatible land distribution patterns.

Date Approved: June 23, 1977 (IBRD)

KENYA

AGRICULTURE: This IDA credit will assist in financing the first phase of an Integrated Agricultural Development Program to stimulate and encourage smallholder cultivation. It will promote the establishment of integrated farm systems by providing needed inputs and by strengthening the extension services and institutions required for a wide range of crop and livestock activities in four provinces of Kenya. The project is expected to encourage production of corn, beans, cotton, potatoes, passion fruit, oil seeds, meat and milk by about 70,000 small farmers operating some 56,000 land holdings.

Borrower: Republic of Kenya.

Terms: $10.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. $10.0 million equivalent World Bank Third Window loan. Term of 25 years with interest at 4.85 percent per annum. Total project cost: $35.7 million equivalent.

Purpose & Benefits: This project will provide more extension services and improved farm input distribution on credit to about 70,000 farmers, most of whom have not previously benefitted from institutional assistance. The project is expected to result in the additional production of 81,000 tons of corn, 6,000 tons of beans, 36,000 tons of potatoes, 56,000 tons of passion fruit, 2,000 tons of cotton, 6,000 tons of groundnuts, 7,000 tons of beef and 34 million litres of milk. Total farm (cash and subsistence) income for a typical high zone farm is expected to increase from $150 to $236 and that of a low zone farm $95 to $137 (equivalents) as a consequence of this project. The internal economic rate of return on the project is estimated at about 37 percent. Project benefits will, however, extend beyond quantifiable increases in production. The project will be the first major effort in Kenya to benefit small farmers producing mainly food crops and will also revitalize institutions servicing these farmers.

Date Approved: July 1, 1976 (IBRD and IDA)

ROADS: The resources from this IDA credit will help the Kenyan Government implement the first phase of a Rural Access Road Program (RARP). This includes equipping and operating eight construction units, equipping a Training Expansion Program, technical services for RARP, evaluating and monitoring the RARP and maintenance and repair of the roads built under the RARP.

Borrower: Republic of Kenya.

Terms: $4.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. $4.0 million equivalent World Bank loan. Term of 25 years with interest at 8.85 percent per annum. Total project cost: $10.1 million equivalent.

Purpose & Benefits: The direct benefits of this project will include higher agricultural production, improved market access and more effective coverage by Government services such as extension and veterinary programs. Potential vehicle operating cost savings are expected to be negligible (in view of low traffic volume) and have not been included among project benefits. The growth in marketed agricultural output attributable to RARP construction is put conservatively at 0.5 percent for anticipated normal growth, excluding any increase in subsistence production. The estimated rate of return for the project is estimated as being in excess of 12 percent, based on direct economic benefits and without taking into account the income redistribution effects and improved access to social services which represent additional benefits from the project. It is estimated the construction program alone will generate some 84,000 man-years of employment for casual labor.

Date Approved: July 1, 1976 (IBRD and IDA)

TOURISM: This project will support implementation of Kenyan Government policies on conservation of wildlife resources and development of tourist attractions. The proceeds of the IDA credit will help finance facilities to increase the tourist capacity and local development impact of various National Parks and Game Reserves, the installation of game-proof barriers, a Wildlife and Fisheries Training Institute, buses for the Wildlife Clubs of Kenya, a Wildlife Planning Unit, policy and feasibility studies on wildlife and tourism development, and an anti-poaching program.

Borrower: The Republic of Kenya.

Terms: $17.0 million equivalent, Third Window loan. Term of 25 years with interest at 4.85 percent per annum. Total project cost: $36.4 million equivalent.

Purpose & Benefits: Although it is impossible to predict the future course of Kenyan wildlife and tourism in the absence of this project, recent trends have been alarming. Certain animal species have nearly disappeared from important game-viewing areas, environmental damage is increasing in the more frequented game parks, and there has been a marked decline in visitor satisfaction in some parks because of congestion. It is reasonable to assume that, without this project, Kenya would suffer from a continuing decline in the economic benefits it derives from wildlife tourism. In estimating the benefits of the project, it has been assumed that the current level of net revenue from wildlife tourism would have been maintained without the project. The combined economic rate of return on the investments proposed in the project is estimated at about 22 percent. Another important feature of this project is the income distribution effect. In addition to the Government, the landowners (mainly Masai group ranchers) living in the game dispersal areas will receive substantial proceeds from game-viewing activities in return for allowing wildlife free traverse of their properties. It is also anticipated the project will generate direct employment for about 840 and indirect employment for 850 persons by 1980. Total employment to be generated by the project over the long run is estimated to be about 5,600 persons by 1990.

Date Approved: July 1, 1976 (IBRD)

AGRICULTURE: This World Bank loan and IDA credit will help finance the Kenyan Agricultural Finance Corporation (AFC) on-going lending program to smallholder farmers in 28 districts over a 3-year period with a portion of the resources earmarked for medium-sized wheat and corn farmers. Program facilities include seasonal credit for crop development, medium-term credit for farm development and farm machinery and equipment and medium-term credit for input suppliers to ensure adequate stocks in rural areas. Technical assistance for the Ministry of Agriculture and AFC will also be furnished in connection with this project.

Borrower: Republic of Kenya.

Terms: $5.0 million equivalent World Bank Third Window loan. Term of 24 years with interest at 4.5 percent per annum. $20.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $40.0 million equivalent.

Purpose & Benefits: This project will provide credit facilities for some 18,000 smallholder farmers and about 500 medium-scale farmers who would not otherwise be able to obtain finance on reasonable terms. The credits extended under the program are designed to enable these farmers to increase production (and incomes) through the more intensive use of their land coupled with proper use of selected seeds, fertilizers, pesticides and other inputs. Credits are also to be made available for the development of dairy enterprises, pig and poultry units and the purchase of farm machinery. The major quantifiable benefits of the project are increased production of corn (35,000 tons), wheat (10,000 tons), potatoes (8,000 tons), rapeseed (6,000 tons), beans (2,000 tons), milk and eggs. Small increases in the output of cotton, pyrethrum, beef, poultry and bacon are also expected. For both smallholders and medium-scale farmers, incremental farm income attributable to the project is to be substantial: smallholder incomes will more than double while medium-scale farms will record an average increase of slightly over 100 percent for both wheat and corn. The overall economic rate of return for the project over 20 years is estimated at 37 percent.

Date Approved: March 29, 1977 (IBRD and IDA)

AGRICULTURE: This sugar project, to be implemented over five years, consists of developing a 3,410 ha. nucleus cane estate and 9,000 ha. of outgrower land, establishing a sugar factory, building related roads and tracks on the estate, strengthening the National Sugar Research Station and, generally, the Kenyan sugar industry.

Borrower: Republic of Kenya.

Terms: $25.0 million equivalent World Bank loan. Term of 20 years with interest at 8.5 percent per annum. Total project cost: $88.5 million equivalent.

Purpose & Benefits: The economic rate of return on the project is estimated at 25 percent. The project will increase sugar production in Kenya by about 60,000 tons per year by 1985 and, with subsequent expansion of the factory, by about 90,000 tons annually by 1988. By substituting for sugar now imported, the project is expected to produce average annual foreign exchange savings of about $30 million equivalent and annual Government net revenues from the project will be about $26 million equivalent when the project is in full operation. The project is to provide salaried employment for about 4,000 persons and increase the incomes of from 4,500 to 7,900 smallhold farmers. It is estimated that average per capita income on project farms, currently about $29 equivalent per year, will rise to about $82 equivalent, as compared with national average per capita income of about $220 equivalent. To avoid or minimize outgrower risks, a suitable price policy providing adequate incentives to farmers is to be adopted to ensure a harmonious company-outgrower relationship. Moreover, the Kenya Sugar Authority will study the possibility of introducing incentive-oriented payment systems for sugarcane including, as examples, a bonus system, quality premiums for cane and profit sharing arrangements.

Date Approved: March 29, 1977 (IBRD)

INTERMEDIATE CREDIT INSTITUTION: The purpose of this World Bank loan is to help the Industrial Development Bank (IDB) implement investment programs consistent with Kenya's industrial development strategy. Specifically, the loan will permit the IDB to provide term financing to well-conceived medium- and large-scale manufacturing projects in Kenya and to enhance the importance of the IDB as a major industrial development finance institution.

KENYA—Continued

Borrower: Republic of Kenya.

Terms: $20.0 million equivalent World Bank loan. Repayable in accordance with the amortization schedule for sub-loans and investments for which withdrawals from the loan account are approved or requested, with interest at 8.2 percent per annum.

Purpose & Benefits: The purpose of this project is to assist the Industrial Development Bank (IDB) with its lending program and to help develop its technical capabilities. The IDB is a major source of funds among Kenyan financial institutions for developing and assisting the manufacturing sector. In both quantitative and qualitative terms, IDB's future policies are designed to enhance its role in further development of this key sector. In the past, the IDB financed approximately 8 percent of Kenya's annual industrial investment by means of loans and equity investments. During the project period, it expects to increase this proportion to 13 percent per annum. Using proceeds from this loan, the IDB will continue to fund projects intended to alleviate unemployment, develop new manufacturing enterprises away from the major urban centers (thereby reducing migration into the cities) and intensifying the use of domestic resources.

Date Approved: May 31, 1977 (IBRD)

IRRIGATION: This project provides for the construction of an irrigation system to service 6,700 ha., the settlement of 5,150 families (36,000 people) on the land and the development of necessary social, educational and administrative services, agricultural management for the system, research facilities and feasibility studies of a possible future site for irrigation and settlement and food producing opportunities in the Bura area.

Borrower: Republic of Kenya.

Terms: $34.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. $6.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $91.7 million equivalent.

Purpose & Benefits: Because of heavy population pressures (only 18 percent of the total land area is of high or medium agricultural potential) the Government of Kenya assigns high priority to opening up new agricultural areas and encouraging increased production on land already being exploited. This latter approach is less costly and yields higher rates of return but it is apparent there are institutional limitations to its use. Dryland farming still has high priority and receives the most capital investments. The creation of new farm land through irrigation has, however, been accorded priority as well. This project thus represents an important departure in Kenya's agricultural development strategy and is the first step towards utilizing all of the land and water resources of the Lower Tana River Basin. Experience gained from the project is expected to be utilized in other irrigation developments in the Basin leading to eventual settlement of up to 50,000 additional ha., providing a livelihood for up to half a million people. The primary direct benefits of the project arise from the production of cotton and food crops grown on irrigated farmland which was formerly unproductive semi-arid territory. The incomes of about 36,000 landless members of settler families will be increased to an average of about $90 equivalent per capita (well above the average rural per capita income). It will also provide employment for about 750 project and Government staff and about 2,500 traders and others who are expected to settle in the project area. The total population deriving a livelihood from the project will be about 65,000 by 1985. The economic rate of return for the project is about 13 percent.

Date Approved: June 7, 1977 (IBRD and IDA)

KOREA

AGRICULTURAL DEVELOPMENT: The main components of the project this World Bank loan will help finance are the construction of dams and canals to irrigate 8,315 ha.; conversion of 2,045 ha. of cultivated upland to irrigated paddy fields; a land consolidation program including construction of ditches, drains and farm roads plus land leveling and boundary realignments on 4,600 ha.; development of 495 ha. for irrigation of upland crops and 550 ha. for irrigated orchards; upland reclamation—primarily bench-terracing—of 1,200 ha. of uncultivated land; improvement of about 80 km. of river channels to increase flood discharge capacity; construction of about 150 km. of village access roads; aerial photography, surveys, and mapping; and technical assistance.

Borrower: Republic of Korea.

Terms: $29.0 million equivalent. Term of 22 years with interest at 8.9 percent per annum. Total project cost: $75.0 million equivalent.

Purpose & Benefits: Implementation of this project will bring about land use changes, more intensive cropping patterns, and higher yields. It is expected to increase rice production by 23,000 tons and barley production by about 9,000 tons. Income on a 0.5 ha. farm benefiting from the project should increase from $870 equivalent to $1,220 equivalent at full development. For 1.5 ha. and 2.5 ha. farms the respective increases in income should be from $1,650 to $3,040 and from $2,489 to $4,620 (equivalents). This project will benefit directly some 10,400 farm families (approximately 63,000 persons) or about half the rural population in the project area. It is estimated that about a third of these potential beneficiaries currently have per capita incomes below the Korean poverty level of around $165 equivalent. The project should also help to narrow the gap between the incomes of the farmers in the area generally and Korea's national average per capita income. Another 60,000 people will benefit indirectly from the village access roads and channel improvement components of the project. The project will create demand for an additional 496,000 man-days of farm labor per year (about 2,100 man-years). The project will also support the Korean Government's policies of increasing foodgrain production and rural incomes. At full development the project is to result in net import savings of about $5 million equivalent annually. The overall economic rate of return is estimated at about 15 percent.

Date Approved: July 27, 1976 (IBRD)

AGRICULTURAL CREDIT: This World Bank loan will support a program of medium and long-term loans extended through the National Agricultural Cooperative Federation (NACF) to about 7,900 farmers. The loans are to be used for the establishment of about 2,100 ha. of apple orchards through sub-loans to about 1,400 farmers, building and equipping improved silkworm rearing houses, including improvement of existing mulberry plantings, through sub-loans to about 3,500 sericulture farmers, sprinkler irrigation to producing orchards of 2 ha. or more, through sub-loans to about 800 farmers, construction and equipping of greenhouses for vegetable production through sub-loans to 1,200 farmers, and construction of on-farm fruit storage facilities through sub-loans to about 1,000 farmers.

Borrower: Republic of Korea.

Terms: $20.0 million equivalent World Bank loan. Term of 17 years with interest at 8.9 percent per annum.

Purpose & Benefits: This program of agricultural credit will directly benefit about 7,900 farmer sub-borrowers and their families (a total of about 47,000 people). Most of the sub-borrowers are expected to be farmers with incomes near or just above the poverty level. At full project development, the additional labor required annually is estimated at about 7,200 man-years equivalent (1,806,000 man-days). Part of this labor will be supplied by family members. At current prices, the estimated additional annual output at full development (a period ranging from 5 to 15 years) will be about $32 million equivalent. A project investment of about $5,000 per farm household is expected to result ultimately in annual incremental income of $4,000 (equivalent). The increased production of fruits and vegetables and the extension of the marketing season should enhance nutritional standards and the variety of local diets. In addition to providing increased employment and income to farmer sub-borrowers, the project is important in that a substantial part of the increased output will stem from the fuller and more efficient use of existing land and labor resources through improved technology. The financial rates of return for the sub-projects are expected to range from 27 percent to 35 percent. With appropriate adjustments for taxes and subsidies, and based on current prices, the economic rates of return range from 29 percent for the on-farm storage component of the program to 38 percent for sprinkler irrigation and greenhouses.

Date Approved: September 21, 1976 (IBRD).

INTERMEDIATE CREDIT INSTITUTION: Of this World Bank loan, $75.0 million equivalent will be used by the Korea Development Bank (KDB) to make sub-loans and investments to finance direct imports for industrial sub-projects during 1977 and 1978 while the remainder of the loan, $7.5 million equivalent, is to be re-lent by KDB to a wholly-owned subsidiary, the Korea Industrial Leasing Company, Ltd. (KILC), which is to utilize the funds to acquire machinery, equipment, facilities and other property for lease to investment enterprises over the same time period.

Borrower: Korea Development Bank. *Guarantor:* Republic of Korea.

Terms: $82.5 million equivalent. Loan to be repaid in accordance with a schedule which would conform substantially to the aggregate of the amortization schedules of sub-loans with interest at 8.7 percent per annum.

Purpose & Benefits: In 1975 the output of enterprises assisted by KDB was valued at $3.6 billion equivalent (about one-third of Korea's total industrial production) and their exports amounted to $2.1 billion equivalent (more than 40 percent of Korea's manufactured goods exports in that year). Projects assisted by KDB also generate considerable employment—its manufacturing clients alone employ 340,000 workers, or about 15 percent of total manufacturing employment in Korea. An analysis of KDB-supported projects indicates that in all cases the economic rate of return exceeded 15 percent, which is above World Bank estimates of the opportunity cost of capital in Korea. The continued growth of the industrial sector is a crucial element in Korea's development strategy and KDB's experienced staff and its ties to the Government and business community make it a particularly suitable channel for providing finance for medium- and large-scale projects. KDB's further growth is not expected to be constrained by a lack of demand for the financing and other services it offers. The main objective of this World Bank loan, in addition to providing resources for high priority industrial investments, is to help KDB expand its operations on an economically and financially sound basis by improving its appraisal standards, overall planning and financial management. Apportioning $7.5 million equivalent of the loan proceeds to the Korea Industrial Leasing Company (a subsidiary of the KDB) is designed to permit the use of a well-managed leasing company as an intermediary to reach small-scale enterprises. In order to achieve a reasonable sectoral distribution of sub-loans and to ensure that the bulk of the loan is not devoted to a few large projects, an informal understanding has been reached that not more than 25 percent of the loan is to be used to finance projects in any single sector, and that within the manufacturing sector this percent will apply to individual industries. Moreover, the size of a single sub-loan is not normally to exceed $5 million equivalent.

Date Approved: November 16, 1976 (IBRD)

AGRICULTURE: This project will improve 20,700 ha. of land through irrigation, reclaim 5,500 ha. of uncultivable tidal flats and develop another 11,900 ha. of land. Rice is to be the main summer crop, with a winter crop of barley on about 70 percent of the lands to be improved. The principal components of the project are: (a) construction of an estuary dam across the mouth of the Yong San Gang; (b) construction of a 4,000 m. sea dike; (c) construction of 16 pumping stations to serve an area of 20,700 ha., including land to be reclaimed and developed; (d) construction of about 315 km. of main and secondary canals; (e) reclamation of about 5,500 ha. of tidal land through land leveling and construction of canals, drains and farm roads; (f) land development comprising consolidation of 3,200 ha. of existing paddy, conversion of 3,250 ha. of upland to irrigated paddy, development of 1,050 ha. of upland for irrigation, and tertiary canals and drains on 4,400 ha. of existing paddy; and (g) construction of project office buildings, warehouses, access roads and a temporary pier required for the construction of the estuary dam.

Borrower: Agricultural Development Corporation (ADC). *Guarantor:* Republic of Korea.

Terms: $95.0 million equivalent. Term of 17 years with interest at 8.5 percent per annum. Total project cost: $167.0 million equivalent.

Purpose & Benefits: This project supports Korean Government policies for increasing foodgrain production through irrigation and land development. Implementation of the project will bring about changes in land use, the reclamation of uncultivated land, and more intensive cropping and higher yields on presently cultivated land. Rice production is expected to rise from 14,100 tons to 43,600 tons and at full agricultural development rice import savings of $22 million equivalent annually are anticipated (net foreign exchange savings, about $15 million equivalent). The project will directly benefit about 29,000 farm families (approximately 174,000 people), 45 percent of whom are estimated to have per capita incomes below the Korean poverty level of around $175 equivalent. At full development this project should increase this group's income by an average of 40 percent. The project will, in sum, help area farmers roughly to maintain their relative incomes position with regard to the Korean national average. The project overall economic rate of return will be about 13 percent.

Date Approved: January 25, 1977 (IBRD)

TRANSPORTATION: This World Bank loan will help finance a project to expand the port of Busan. Specific elements include: (a) a 700 m. extension of container berths and a 335,000 sq.m. expansion of stacking areas; (b) dredging to an alongside depth of 12.5 m.; (c) an access road, guard house, and an 8,000 sq.m. container freight station, ancillary works and utilities; and (e) the rehabilitation of piers 3 and 4, the central wharf, and lighter wharf No. 5. In addition, the project comprises procurement of container cranes and mobile container handling equipment, two tugboats, and engineering, consulting and technical services.

Borrower: Republic of Korea.

Terms: $67.0 million equivalent World Bank loan. Term of 17 years with interest at 8.5 percent per annum. Total project cost: $112.0 million equivalent.

Purpose & Benefits: Total traffic through Busan port rose from 13.3 million tons in 1973 to an estimated 19 million tons in 1976 with the proportional increase in containerized cargo having been relatively more rapid —from 0.9 million tons in 1973 to an estimated 3 million tons in 1976. This rapid growth in containerized cargo was achieved despite inadequate port facilities. Completion of an earlier port project in 1978 will permit the introduction of direct services by mainline container traffic and the facilities to be provided under this project will be needed by 1981 to handle the further growth of container traffic efficiently. Consultants reviewed several alternative sites in the vicinity of Busan and near Masan and concluded that the project selected is the lowest-cost alternative. The current rapid industrialization of southeastern Korea is highly dependent on imports of industrial goods and raw materials, and on export markets for its products. Most of this large and growing external trade moves through Busan. In addition, the port handles a substantial volume of containerized goods originating in, or destined for, the Seoul area. Without the Busan port improvements this traffic would be subjected to higher transportation costs and southeastern Korea's economic development could be impeded as a result. A conservative evaluation of the project, based on the cost of additional ship waiting time and additional transportation costs on containerized cargo in the absence of the project, indicates an economic rate of return for the project of about 14 percent.

Date Approved: April 12, 1977 (IBRD)

INTERMEDIATE CREDIT INSTITUTION: The proceeds of this World Bank loan are to be used to help cover the foreign exchange requirements of industrial sub-projects financed by the Korea Development Finance Corporation (KDFC).

Borrower: Korea Development Finance Corporation (KDFC). *Guarantor:* Republic of Korea.

Terms: $70.0 million equivalent World Bank loan. Amortization to conform substantially to the aggregate of the amortization schedules applicable with a maximum repayment period of 17 years with interest at 8.2 percent per annum.

Purpose & Benefits: Continued growth of the industrial sector is a crucial element in Korea's development strategy. The KDFC, whose performance has been highly satisfactory from both developmental and institutional standpoints, is a particularly well-suited vehicle for financing development of the industrial sector. It has made, and continues to make, significant contributions toward improving the basic economic and financial resource mobilization and allocation systems in Korea. These include KDFC's initiative in establishing the Korean Investment Finance Corporation (KIFC), its promotional activities, the creation of a leasing company and its support of small- and medium-scale industries in less developed areas of the country through joint projects with regional commercial banks. World Bank Group association with KDFC since 1967 has been productive and mutually beneficial and with the KDFC as an intermediary, World Bank Group resources have been allocated to some 215 economically and financially viable projects in the manufacturing, mining, agro-industrial, tourism and transport sectors of the Korean economy. This association has enabled the World Bank Group to exert its influence in encouraging KDFC to sustain and improve operational standards and enhance its developmental contributions. It is expected that over the period of commitment for this loan, the KDFC will make further institutional and developmental improvements. Subloans approved under previous World Bank loans ranged in size from $110,000 to $3.95 million equivalent and economic rates of return ranged from 15 percent to 67 percent. The weighted average economic rate of return on a large sample of KDFC-financed projects is 33.4 percent.

Date Approved: June 14, 1977 (IBRD)

INDUSTRY: This heavy machinery project is designed to abet the local manufacture of most of the equipment needed for power, steel, chemical and petrochemical facility projects in Korea. Components of the project include: (a) foundry and forge shops; (b) fabrication shops; (c) machine shops; (d) assembly and test shops; (e) support facilities; (f) auxiliary facilities; and (g) technical assistance.

Borrower: The Republic of Korea.

Terms: $80.0 million equivalent World Bank loan. Term of 14 years with interest at 8.2 percent per annum. Total project cost: $390.9 million equivalent.

Purpose & Benefits: This project will make a significant contribution to the Korean Government objective of substituting local manufacture for imports of heavy plant equipment. At full operation, the project is expected to lead to $210 million equivalent of net foreign exchange savings annually. The project will create direct employment for about 8,030 persons at full production plus employment for another 30,000 persons in local supplying and support industries. The most significant contribution of the project to Korea will, however, be the development of the local machinery industry and the upgrading of Korea's technological base. The project is to incorporate a number of advanced project and manufacturing technologies, new to Korea. This advanced technology will also filter down to supplying and support industries, especially the smaller companies, in the forms of product selection, technology licensing and manpower training in precision manufacturing. The project has an estimated economic rate of return of 17.4 percent.

Date Approved: June 23, 1977 (IBRD)

LESOTHO

DEVELOPMENT FINANCE COMPANY: This IDA credit will assist in covering the Lesotho National Development Corporation (LNDC) foreign exchange requirements for development finance operations through mid-1979; and the Basotho Enterprises Development Corporation (BEDCO) foreign exchange needs for small-scale enterprises loans through mid-1979.

Borrower: Kingdom of Lesotho.

Terms: $2.5 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum.

Purpose & Benefits: This IDA credit will provide medium- and long-term funds for developing industry, tourism and small-scale enterprises in Lesotho. Based on past experience, the $2.2 million equivalent to be relent to LNDC is expected to create about 2,300 new jobs in Lesotho at an average investment of about $995 equivalent per job created. While the employment effects of BEDCO's portion of the credit are not quantifiable, it will also make a significant contribution to Lesotho's economy. The credit will, through the provision of technical and financial assistance, aid the two institutions further to improve their capabilities of identifying and exploiting available investment opportunities. Essential to this process is the development of Basotho entrepreneurs and for this purpose LNDC and BEDCO are to expand business management training and other technical assistance to local enterprises. Continued improvement in LNDC and BEDCO policies and operations, resource allocation and financial discipline, will reduce their dependence on public financing and permit the two development finance companies to generate more of their own investment resources.

Date Approved: April 21, 1977 (IDA)

LIBERIA

INTERMEDIATE CREDIT INSTITUTION: This World Bank loan will help the Liberian Bank for Development and Investment (LBDI) finance the foreign exchange costs of proposed investments during the period 1977 to 1979 in productive Liberian enterprises in the manufacturing, agriculture, transportation, tourism and services sectors. The project will also provide technical assistance to LBDI.

Borrower: Liberian Bank for Development and Investment. *Guarantor:* Liberia.

Terms: $7.0 million equivalent. Term of 15 years with interest at 8.5 percent per annum.

Purpose & Benefits: LBDI's operations have expanded rapidly in recent years. During 1974 and 1975 it approved 95 loans totaling $7.5 million equivalent. In general, LBDI's financing activities have been used to support relatively small-scale Liberian enterprises and more than 50 percent of its loan approvals have been for loans of less than $10,000 equivalent. About eighty percent of the benefitting projects are Liberian controlled—in contrast to the general pattern of lending and industrial ownership in Liberia. More than half of the projects and 42 percent of the total amount lent involved rubber production, timber and wood processing and other agri-business projects. LBDI's financial position is sound—total assets rose to $12 million by the end of 1975, an increase of $4.1 million over the previous year, due largely to increases of $3.3 million in loan and equity investments. LBDI's long-term debt showed a corresponding increase of $2.9 million (to $8.3 million). According to a loan agreement between the World Bank and LBDI, the latter's debt/equity ratio is limited to 7:1 with debt defined as including the redeemed (Government promissory notes converted to cash loans by the Government) or discounted (by LBDI) portion of promissory notes from the Government. At the end of 1975, this ratio stood at 6.3:1. LBDI has taken steps to increase its paid-in capital by $2 million, so as to raise its borrowing capacity. LBDI's local resource requirements during the period 1977 to 1979 are estimated at $0.7 million for equity and $4.9 million for loan commitments. At the present time LBDI has $160,000 in local resources available and additional funds are expected to be raised through increased equity, the redemption of Government notes, and internal cash generation including loan collections. These revenue sources are expected to cover LBDI's local expenditures fully during this period.

Date Approved: September 7, 1976 (IBRD)

AGRICULTURE: This project will assist some 9,000 small farmers in upper Bong County develop 6,000 ha. of upland rice, 2,000 ha. of swamp rice, 3,000 ha. of cocoa and 1,500 ha. of coffee through the provision of credit-financed farm inputs, extension services, and assistance in crop processing and marketing. The project will also help: (a) construct, recondition or maintain 840 km. of farm-to-market roads; (b) establish farm cooperatives and banking facilities in the project area; (c) improve agricultural research facilities; and (d) construct 300 village wells. A smallholder credit program is to be created to provide development loans for coffee and cocoa (repayable in 12 years) and for swamp rice (repayable in 8 years) together with seasonal loans (repayable at harvest times). The loans will bear interest or service charges at 10 percent per annum.

Borrower: Republic of Liberia.

Terms: $7.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $20.3 million equivalent.

Purpose & Benefits: The overall economic rate of return calculated for this project is 21 percent. At

LIBERIA—Continued

project maturity (1990), direct benefits will take the form of additional production of about 8,700 tons of paddy rice, 3,000 tons of cocoa beans and 1,500 tons of clean coffee annually. Beginning in 1990, the project is expected to generate net foreign exchange earnings and savings of about $6.7 million equivalent annually. Some 9,000 smallholder families with average holdings of about 2 ha. will benefit directly from increased farm production and by 1990, their average net family income will increase from the present $360 equivalent ($68 equivalent per capita) to about $850 equivalent ($160 equivalent per capita) in real terms. This level of income will, however, still be substantially below the present national average per capita Liberian income of $410 equivalent. The project will also have important secondary benefits stemming from improved roads, banking facilities, health services and a better marketing system. Development of cooperatives will create rural capabilities for providing farm support services and the strengthening of the technical and managerial capacities of the Agriculture Ministry will result in improved planning and implementation of other rural development projects.

Date Approved: April 19, 1977 (IDA)

EDUCATION: This World Bank loan will help finance the strengthening of Liberia's industrial training system through the construction, furnishing and equipping of buildings for an agricultural and industrial training board and a vocational training center and the provision of technical assistance, fellowships, and equipment and vehicles to develop manpower planning programs. Forestry training will be supported by the construction, furnishing and equipping of a training institute for forest rangers and forest workers plus related technical assistance and fellowships. The project is designed to improve secondary education—particularly in science and technology—by the construction, furnishing and equipping of four science and technology centers at rural secondary schools, the provision of vehicles to transport students to these centers and a program of technical assistance and fellowships to train administrators for the science, technical and secondary education programs. The Division of Educational Facilities in the Ministry of Education will be provided with equipment, vehicles, technical assistance and fellowships to strengthen its organization and staff.

Borrower: Republic of Liberia.

Terms: $6.3 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $9.5 million equivalent.

Purpose & Benefits: The shortage of trained manpower at all levels is one of the most serious development constraints in Liberia. As a result, Liberia depends heavily on expatriate technical skills especially at professional and managerial levels, a dependence which represents a substantial element in the cost of development projects. This project will support Liberian Government manpower development efforts by intensifying local industrial and vocational training, forestry training, manpower planning, and science and technology education at the secondary school level. Together with other World Bank Group education projects in Liberia, it will also help correct traditional geographical imbalances in the distribution of school facilities.

Date Approved: May 3, 1977 (IBRD)

MADAGASCAR

EDUCATION: The proceeds of this credit will help finance buildings, furniture and equipment for five Regional Education Centers and one National Teaching Materials Production Center. Textbook development and technical assistance for the National Teaching Materials Production Center in its initial operating stages, aid to the statistical section of the Ministry of Education; project evaluation; and preinvestment studies for future projects will also form part of the project.

Borrower: Democratic Republic of Madagascar.

Terms: $14.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $17.5 million equivalent.

Purpose & Benefits: Fundamental changes in the content and delivery of education are required if the educational and training systems in Madagascar are to meet the needs created by mass participation in development. The emphasis of this project is on helping to bring about such changes. Educational quality and relevance at the primary level are to be provided by training facilities for National Service teachers, whose employment will permit a reduction in the number of pupils per teacher, and by assisting inspectorate visits to schools and the production of new curricula and textbooks. Secondary education is to be enhanced by encouraging local production of equipment and by training teachers in its use. Local education administration will be assisted through the provision of decentralized facilities. The objective of the project is to train about 1,800 National Service teachers a year (20 percent of the total number required). It will also provide a textbook and student guide for each major study area for about one million primary pupils and about half of the estimated equipment needs of the secondary schools in Madagascar.

Date Approved: November 2, 1976 (IDA).

MALAWI

POWER: These loan and credit resources will help finance construction of a rock-fill dam on the Shire River at Nkula, a pressure cut-and-cover conduit, headrace tunnel, penstock and tailrace outlet system and a powerhouse for five 18-MW. hydropower generating units, two 18-MW. hydro units as the first stage of developing this power source, and consulting services and training.

Borrower: Electricity Supply Commission of Malawi (ESCOM). *Guarantor:* Malawi.

Terms: $9.0 million equivalent World Bank loan. Term of 20 years with interest at 8.5 percent per annum. $8.0 million equivalent World Bank Third Window loan. Term of 24 years with interest at 4.5 percent per annum. $8.0 million IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $78.0 million equivalent.

Purpose & Benefits: This project represents the least-cost solution (of several alternatives studied) for satisfying Malawi's growing power demand through the early 1980's. Among the alternatives analyzed were: (a) two diesel sets of 10 MW. each as a first step to be followed by the Nkula scheme; (b) two coal-based steam units of 20 MW. each followed by hydro projects; and (c) hydro units only. Calculations demonstrated that for discount rates below 21 percent the proposed project is the least-cost solution. Moreover, this conclusion is not affected by substantial changes in the assumptions underlying the calculation. The rate of return on this project is estimated at 10 percent.

Date Approved: March 29, 1977 (IBRD and IDA)

WATER SUPPLY: This IDA credit will help support a program to improve and extend existing pumping and treatment facilities at the Walker's Ferry intake station, improve the supply main between the intake and Blantyre, and the distribution system in the Blantyre area. The project also calls for the construction of staff housing and workshop buildings, the procurement of vehicles, tools, accounting and other office equipment, and the provision of engineering and management consulting services and training.

Borrower: Republic of Malawi.

Terms: $7.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $16.6 million equivalent.

Purpose & Benefits: The population of Blantyre, which was about 210,000 in 1975, is growing at an annual rate of 6.5 percent—or about 2.5 times the national population growth rate. Water demand, however, has risen approximately twice as fast as the rate of population increase because of increased industrial needs, higher domestic per capita water use, and the extension of water supply service to parts of the city not previously served. This project is the least-cost alternative for supplying treated water to the Blantyre area to satisfy future growth in demand and, by the mid-1980's, is expected to be serving a population of about 360,000. Improvements in the distribution system will help reduce current supply interruptions and delivery at inadequate pressure. The rate of return on the project is estimated at about 7 percent. These are not all of the benefits, however—the project will also reduce health hazards and improve public health standards through the extension of piped water service to residents now relying on local streams and other water supplies of doubtful quality. At the present time, about 50,000 persons live in unplanned, low-income, areas without piped water service. The project will bring improvements in these areas by providing water kiosks. The project will not itself prevent or reduce pollution in the Blantyre area. Where direct water connections to buildings are made, however, sewer connections or septic tanks will be required. This requirement will, in effect, result in improved sanitation in those areas of Blantyre which do not now have water service.

Date Approved: May 12, 1977 (IDA)

MALAYSIA

EDUCATION: The proceeds of this World Bank loan will assist in financing the construction and equipment of 150 primary schools, four education resource centers, three industrial training institutes, three community service centers, and the expansion or replacement of another 700 primary schools, a teacher training college, and two industrial training institutes. Other elements in the project include a study of the community education system in anticipation of its expansion and improvement, and technical assistance for these programs.

Borrower: Malaysia.

Terms: $35.0 million equivalent. Term of 17 years with interest at 8.9 percent per annum. Total project cost: $124.6 million equivalent.

Purpose & Benefits: A central objective of this project, and an important justification for the World Bank financing, is to strengthen Malaysian Government planning and implementation mechanisms in order to improve the allocation of available educational resources. The project will introduce objective procedures for allocating resources among the various educational levels, among States, and within the States. Under the project, school planning offices at Division, State and National levels are to be strengthened both in terms of personnel and expertise. Procedures for the collection and analysis of data needed for school mapping will be standardized and a set of indicators will be developed to measure State educational priorities. A large proportion of Malaysia's primary school enrollment is currently accommodated in substandard facilities which impede effective learning. Since the inadequate facilities and poorly qualified teachers tend to be concentrated in areas also deprived of many other social and economic amenities, investment in primary education in these disadvantaged areas is to receive priority. This project will improve primary school facilities, relieve overcrowding, attract better teachers to rural areas, and retrain teachers. Over the short term, the improved quality of primary education for 240,000 youths in disadvantaged areas is expected to reduce the dropout rate, increase pupil achievement, and raise the level of primary education in the poverty States closer to that in the other States. In the medium term, the program should help reduce disparities among socio-economic groups and, over the long pull, the project will help reduce income differentials, one cause of which relates to inequities of education opportunity.

Date Approved: September 21, 1976 (IBRD).

AGRICULTURE: This project is designed to improve the productivity and incomes of over 60,000 paddy smallholders through the construction and rehabilitation of approximately 195 small irrigation systems. The project also includes procurement of equipment to maintain the completed systems, training and technical assistance, and a feasibility study of the proposed Rompin/Endau irrigation and land settlement project.

Borrower: Malaysia.

Terms: $39.0 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $89.0 million equivalent.

Purpose & Benefits: This project will provide facilities needed to raise crop yields, production, and the incomes of paddy farmers throughout Malaysia. In addition to furthering basic national policies, the project will yield high economic returns—the overall economic rate of return for the list of projects involved is estimated at about 23 percent. The rate of return is relatively high because of the short construction periods, the expected rapid agricultural development, and the low opportunity cost of paddy smallholder labor. All systems accepted for financing are to be subject to thorough technical and economic evaluation and must have expected rates of return of 10 percent or more, except in areas of extreme poverty where there are no alternative employment opportunities, when an 8 percent return is to be acceptable. The Government of Malaysia has agreed to ensure that the necessary additional Operations and Maintenance (O&M) staff and funding requirements will be met and that the project will be provided the help necessary to further upgrade the Drainage & Irrigation Department's (DID) O&M capability. The Agriculture Services Coordinating Committee is to ensure that related agricultural services are made available as needed.

Date Approved: January 2, 1977 (IBRD)

TRANSPORTATION: This World Bank loan will support a project to improve the transportation network on the island State of Sabah through the reconstruction of trunk roads and the institution of a four-year road maintenance and upgrading program. The project will also assist in setting up a pilot road maintenance and pavement strengthening program for Peninsular Malaysia as well as help fund a transport/railway study for Peninsular Malaysia and an urban study for Sabah.

Borrower: Malaysia.

Terms: $35.0 million equivalent World Bank loan. Term of 17 years with interest at 8.5 percent per annum. Total project cost: $108.0 million equivalent.

Purpose & Benefits: The project will provide an overall graduated approach to improving the Sabah road network through: (a) reconstruction of major west and east coast trunk roads; (b) upgrading several other priority trunk roads; and (c) improving maintenance for the entire network. Transportation costs will be reduced through savings in vehicle operating expenses and road maintenance and repairs (which are regularly needed after heavy rains). The project will also improve communications between Sabah's towns and villages and reduce the isolation of the island's scattered population by providing easier and faster transport. The average economic rate of return on the project components to be covered by Bank financing is 18 percent.

Date Approved: March 15, 1977 (IBRD)

POWER: This project, to be financed in part with the proceeds of a World Bank loan, consists of building, supplying and installing an oil-fired thermal power station of 2 x 120 MW. at Pasir Gudang and the supply and installation of related transmission facilities.

Borrower: Malaysia (National Electricity Board (NEB)).

Terms: $22.0 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $164.0 million equivalent.

Purpose & Benefits: Consultant studies of the NEB system expansion program confirm that the sequence of projects envisaged represents the least-cost solution to the problem of meeting power load requirement up to 1983. These projects include the Temengor Hydroelectric Development, the Prai Thermal Power Station extension, and this project—the Pasir Gudang Thermal Power Plant and associated transmission facilities. The internal rate of return for the project is approximately 14 percent. Since 1958, when the World Bank first became associated with NEB, the management of that institution has been considerably strengthened and it is now endowed with a sound organizational structure and is operating with high degrees of autonomy and efficiency. Continued World Bank involvement in the NEB development program will help ensure continued steady and healthy growth in Malaysia's power sector. The World Bank can also provide significant assistance to NEB in the analysis of least-cost projects and help facilitate the flow of commercial funds to NEB through co-financing arrangements.

Date Approved: June 2, 1977 (IBRD)

MALI

AGRICULTURE: This project will help to expand the production of cotton, kenaf, corn and rice through improved cultivation methods. Project farmers will be supplied with technical advice, seed multiplication facilities, applied research and credit. Other elements in the project involve improving animal husbandry, expanding cotton processing facilities, improving kenaf settling ponds, building a rice mill, providing storage for inputs, undertaking studies for the future development of areas freed from onchocerciasis, improving rural health services, and educating the rural population through young farmer, blacksmith and functional literacy programs.

Borrower: Republic of Mali.

Terms: $15.5 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $44.6 million equivalent.

Purpose & Benefits: The direct benefits of this project will consist of the increased production generated and resultant higher incomes for about 108,000 farm families (92,000 in cotton growing, 8,000 in kenaf development and 8,000 in swamp rice development). Incremental net foreign exchange earnings are expected to total nearly $25 million equivalent annually by 1980. The economic rate of return on this project is estimated at 25 percent for the livestock component and 44 percent for the crop development component. The aggregate rate of return on the project is estimated at about 44 percent. Secondary benefits from the project, not reflected directly in the economic rate of return calculations, include the impact of the functional literacy and health training program, the demonstration effects of an integrated approach to rural development, and the expansion of non-farm rural employment in blacksmithing, cotton ginneries, the rice mill and the kenaf processing plant.

Date Approved: December 14, 1976 (IDA)

TRANSPORTATION: This IDA credit will help finance railway track improvements, the rehabilitation and strengthening of bridges, telecommunications improvements, procurement of motive power, rolling stock and workshop equipment, and consulting services and training.

Borrower: Republic of Mali.

Terms: $10.5 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $78.2 million equivalent.

Purpose & Benefits: The railway is the only mode of transport in western Mali and provides the link between Bamako and Kayes—Mali's second largest city—and numerous small towns and villages. It also provides nearly all of the domestic passenger and freight service to the Senegalese border. The principal activity is carrying international traffic to and from Dakar, Senegal. Benefits of the project include operation of a vital transportation facility, reduced maintenance and operating costs, new equipment and substantially increased capacity for petroleum traffic. The economic rate of return for the project is estimated at 23 percent. Individual components of the program can be economically justified even under the lower traffic growth assumptions utilized for sensitivity analysis purposes.

Date Approved: May 17, 1977 (IDA)

MAURITANIA

TECHNICAL ASSISTANCE: This credit will help finance a four year technical assistance program calling for five expatriate professionals in the Ministry of Planning to elaborate long-term general and sectoral economic strategies, set priorities, identify projects and undertake economic and financial analysis; and temporary consultants to deal with special subjects as needed.

Borrower: Islamic Republic of Mauritania.

Terms: $2.7 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $3.4 million equivalent.

Purpose & Benefits: The technical experts to be provided under this project will help the Mauritanian Government in its efforts to formulate effective and well planned development programs and to identify and prepare specific investment projects. This will strengthen the planning machinery by alleviating the current critical shortage of experienced economists and sector advisers. The risk is the usual one for projects of this type—finding suitable expatriates and ensuring their cooperation with local staff. It is difficult to recruit high quality experts for this type of advisory position but initial efforts to identify suitable candidates have had some encouraging results.

Date Approved: November 30, 1976 (IDA)

AGRICULTURE: This IDA credit will fund a three-year program of technical assistance comprising seven expatriate experts and seven Mauritanian professionals to strengthen the Societe Nationale pour le Developpement Rural (SONADER), to identify and prepare rural development projects, and to assume responsibility for the execution of some ongoing irrigation projects. Short-term consultant services on special studies and topics (such as training) and the acquisition of certain equipment will also be included in the project.

Borrower: Islamic Republic of Mauritania.

Terms: $3.5 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $4.4 million equivalent.

Purpose & Benefits: This project will help Mauritanian Government efforts to build SONADER into an efficient institution capable of taking advantage of investment opportunities and ensuring implementation of high-priority investments such as the Gorgol Basin Development Scheme. Work done on this project will be crucial to the preparations needed to attract necessary additional foreign assistance.

Date Approved: March 31, 1977 (IDA)

MAURITIUS

PORT: This World Bank loan will help finance a project involving the construction of three berths, storage facilities and port administration buildings, port dredging, consultant services for engineering and construction supervision, the purchase of port operating and fire fighting equipment, and technical assistance to the Mauritius Marine Authority (MMA).

Borrower: Mauritius.

Terms: $3.6 million equivalent World Bank Third Window loan. Term of 25 years with interest at 4.7 percent per annum. Total project cost: $23.5 million equivalent.

Purpose & Benefits: The project is estimated to have a 19 percent economic rate of return over its 25 year life. This return was calculated by comparing the costs of the new investment with continued lighterage operations. Since implementing this project will permit the avoidance of otherwise necessary lighterage investments, these are treated as capital cost savings in calculating the economic rate of return. Quantified project benefits, based on updated estimates include: (a) avoided lighterage costs amounting to about $5.15 million; (b) operational cost savings of about $2.50 per cargo ton; and (c) reduced cargo loss and damage, through eliminating the double handling entailed in lighterage operations, estimated at 1.5 percent of the average value per ton, $446, for a saving of $6.68 per ton (equivalents).

Date Approved: November 16, 1976 (IBRD)

MEXICO

TOURISM: This project involves financing tourist facilities at two locations in Baja California. At Loreto the project comprises infrastructure (electric power, telecommunications, roads, recreational facilities, and environmental sanitation) plus a 250-room hotel and airport facilities. In the San Jose del Cabo area, similar infrastructure facilities, a 250-room hotel and airport facilities are to be installed. Other project components include community development, tourism promotion and conservation programs.

Borrower: Nacional Financiera, S.A. (NAFINSA).
Guarantor: Mexico.

Terms: $42.0 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $84.0 million equivalent.

Purpose & Benefits: This loan will help Mexico's National Fund for Tourism Development (FONATUR) finance infrastructure investments and a pilot hotel in two tourist regions for projects with a total cost of $84 million equivalent. Private investors are expected to finance the balance of the superstructure—hotels, apartels, condominia, villas, restaurants and other tourism facilities—involving an estimated additional investment of about $129 million equivalent. The grand total estimated cost for the entire investment package is about $213 million equivalent. The internal economic rate of return for the project as a whole is 20 percent—36 percent of project net financial benefits will go to the Government, 27 percent to unskilled labor and the remainder to owners of hotels, shops, restaurants and other facilities. The project and related investments are expected to increase Mexico's foreign exchange earnings substantially. By 1982 annual gross foreign exchange earnings from the facilities are expected to be $34 million equivalent, increasing to $110 million equivalent by 1990. On a net basis, foreign exchange earnings will rise from $17 million equivalent in 1982 to $89 million equivalent in 1990. Direct employment created by the facilities is estimated at about 12,000 new jobs and an additional 13,000 new jobs will be generated in related activities such as handicrafts, food processing and transportation.

Date Approved: May 19, 1977 (IBRD)

RURAL DEVELOPMENT: This project is aimed at providing help for a program to raise the incomes, and improve the standards of living of poor rural families in 20 selected micro-regions of Mexico. A rural industrial component of the project will cover about 30 micro-regions. The productive components of the project include: (a) construction and rehabilitation of small-scale water facilities to irrigate about 34,000 ha. and provide for domestic and livestock use; (b) development of rural industries, including credit facilities, technical assistance for rural industries, and training of personnel; (c) development of about 500 livestock units through land clearing, pasture establishment, fencing and construction of watering and handling facilities; (d) soil and water conservation, including construction of contour ridges, terraces, checkdams or other conservation works on about 80,000 ha.; (e) pilot fruit production units, including planting of a total of 7,500 ha.; (f) provision of seasonal production credit, and medium- and long-term development credit to permit more effective use of infrastructure facilities; and (g) other productive investments including bookkeeping, small stock, forestry and fisheries development. The support components of the project include: (a) construction of 2,000 km. of feeder roads; (b) installation of electric power distribution systems in 300 villages to the benefit of about 131,000 persons; (c) support of a rural marketing program; (d) organization and training of farmers for greater participation in development programs; (e) provision of intensive technical assistance packages to promote adoption of improved farming methods; and (f) assistance for preparing feasibility studies for directly productive investments in each micro-region. The social infrastructure components of the project include: (a) installation of water supply systems to serve about 214,000 persons; (b) construction or renovation and equipping of 1,500 classrooms to accommodate about 60,000 students; and (c) provision of materials and equipment for self-help activities in *ejidos* and villages, such as housing improvements, and community centers.

Borrower: Nacional Financiera, S.A. *Guarantor:* Mexico.

Terms: $120.0 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $255.0 million equivalent.

Purpose & Benefits: This project will benefit areas with a total rural population of about 1 million. Beneficiaries targeted for project support generally have family incomes ranging from $250 equivalent to $750 equivalent placing them in the lower 40 percent of the national income distribution scale. Under the project, about 46,000 farm families will benefit from directly productive activities and some 32,000 farm families (190,000 persons) are expected to achieve a near doubling of income over a period of eight years. The incomes of an additional 14,000 farm families benefitting from the 34,000 ha. to be irrigated are expected to triple from present levels. About 200,000 persons will have access to improved rural infrastructure and about 65,000 man-years of temporary employment and 30,000 permanent jobs are to be created. Rural industries supported by the project will provide the equivalent of full-time employment for approximately 4,000 persons. The industry component of the project is an important model for further rural investments to increase job opportunities for the large number of rural unemployed and underemployed. The estimated average economic rate of return for the project as a whole is 23.7 percent, varying as among micro-regions from 13.2 to 36.5 percent.

Date Approved: June 16, 1977 (IBRD)

MOROCCO

AGRICULTURE: Two previous agricultural credit projects which the World Bank helped to finance in Morocco were aimed primarily at increasing agricultural production through the mechanization and modernization of medium and large farms and at strengthening Morocco's Caisse Nationale de Credit Agricole (CNCA). This third project is also designed to increase agricultural output to meet rising demand and further to reinforce the CNCA's capabilities as an agricultural credit institution. In addition, this project will contribute to raising small farmer incomes and the incomes of previously landless farm workers now organized into cooperatives. This project is expected to cover most of CNCA's program for medium- and long-term lending through August 1979 (excluding CNCA lending to State and private companies). Total expected investment is about $315 million equivalent, of which 27 percent is to be for livestock development, 22 percent for tractors and other machinery, 19 percent for farm building, 16 percent for draft animals and related equipment, 8 percent for small irrigation equipment and 6 percent for plantations.

Borrower: Caisse Nationale de Credit Agricole. *Guarantor:* Morocco.

Terms: $35.0 million equivalent. Term of 13 years with interest at 8.7 percent per annum. Total project cost: $315.3 million equivalent.

Purpose & Benefits: This project will help expand CNCA's financial support for both commercial farmers and small farmers, with at least 350,000 farmers expected to benefit from CNCA operations (as compared with 230,000 at present). About 40 percent of the benefiting farmers are below the poverty level. The project overall economic rate of return is estimated at about 29 percent. Financial rates of return for sample farm models range from 14 to 25 percent. Agricultural production to be generated by the project is expected to be valued at about $350.0 million equivalent and will help improve Morocco's balance of payments by reducing imports of grain, oilseeds, sugar, meat and milk and by increasing vegetable exports to European countries. The project will create about 40,000 new jobs, an estimated 20,000 man-years of additional family labor, about 10,000 permanent jobs and about 10,000 man-years of temporary labor. The average investment cost per man-year of work created will be about $6,200 equivalent.

Date Approved: January 11, 1977 (IBRD)

INDUSTRY: This World Bank loan will help finance construction of a 1.2 million ton per year cement plant near Oujda in the Eastern Region of Morocco, plus related distribution facilities.

Borrower: Cimenterie de l'Oriental (CIOR). *Guarantor:* Morocco.

Terms: $45.0 million equivalent. Term of 14 years with interest at 8.5 percent per annum. Total project cost: $182.0 million equivalent.

Purpose & Benefits: This plant has been conservatively designed, its raw material base extensively surveyed and evaluated, and the planned training and technical assistance programs will provide adequate skilled personnel to operate and manage the plant. The project is designed to help develop Morocco's less-developed Eastern Province. While the direct employment impact will be relatively small (1,200 jobs during plant construction and 500 during operation), construction of the plant will improve the availability of cement and thus will encourage labor-intensive housing development and other construction activity. Morocco is experiencing an acute shortage of domestically-produced cement and has had to import very substantial amounts in recent years while still not meeting total demand. Major foreign exchange savings will accrue as a result of this project. Average net foreign exchange savings in real terms are estimated at about $30.0 million equivalent per year. The overall economic return for the project is 13.8 percent.

Date Approved: March 22, 1977 (IBRD)

IRRIGATION: The irrigation project this World Bank loan will help to finance (second Doukkala project) comprises enlargement of a main supply canal (22 km.) construction of 10 km. of feeder canals and the installation of automatic flow regulators, construction of six pumping stations, installation of 31 km. of 60 kv. and 62 km. of 22 kv. power transmission lines, land preparation and consolidation, the installation of 450 km. of a buried pipe distribution system, construction of main drainage channels and 108 km. of roads and the reinforcement of 64 km. of existing roads. Other components of the project include the provision of equipment for extension, operation, maintenance, artificial insemination, and telecommunications, construction of four milk collection centers, infrastructure for five villages, farm inputs, credit and extension services, and the strengthening of applied agricultural research activities.

Borrower: Kingdom of Morocco.

Terms: $41.0 million equivalent World Bank loan. Term of 30 years with interest at 8.2 percent per annum. Total project cost: $121.0 million equivalent.

Purpose & Benefits: This project is part of a long-term comprehensive program of irrigation development in the Oum-er-Rbia river basin. The principal benefit expected is a substantial increase of agricultural production which will contribute to meeting domestic demand for sugar, milk, meat, cereals and vegetables. Cotton, and possibly vegetables, for export will also be produced. At full development, net incremental production will be valued at the equivalent of about $15 million per year and the project will directly benefit 3,400 farm families, 77 percent of whom presently have incomes below the absolute poverty level. Under the project, average per capita income will increase by 140 percent to $390 equivalent at full development but, despite this, 42 percent of the farmers who now own 2 ha. or less land will still have farm incomes below the poverty level. About 5,500 man-years of family labor will be created annually by the project. Through its consolidation component, the project will help to eliminate land fragmentation, thereby improving agricultural efficiency. Financial rates of return will be higher for the smaller, than for the larger, farmers (at 100 percent for the smallest farmers and 35 percent for the largest). The economic rate of return for the project is estimated at 11.6 percent.

Date Approved: May 3, 1977 (IBRD)

INTERMEDIATE CREDIT INSTITUTION: These World Bank loan funds will help meet part of Banque Nationale pour le Developpement Economique (BNDE) requirements for financing the import components of specific industrial enterprise projects as well as to finance a small-scale industry scheme.

Borrower: Banque Nationale pour le Developpement Economique (BNDE). *Guarantor:* Morocco.

Terms: $45.0 million equivalent World Bank loan. Term of a maximum of 15 years at 8.2 percent interest per annum.

Purpose & Benefits: Industrial expansion remains one of the prime objectives of the Moroccan Development Plan for the period 1978 to 1982. Based on a pipeline of 60 projects requiring at least $300 million equivalent in direct term loans, BNDE expects its portfolio to grow by about 8 percent per annum (in current terms) over the next few years. Total loan approvals are presently estimated to reach $755 million equivalent in 1977–80 while equity participations are estimated at $12 million equivalent. BNDE's resource requirements for 1977–79 are estimated at $480 million equivalent, to be provided: $100 million equivalent from the Eurodollar (floating rate) market, $82 million equivalent in loans and credits from Spain, $67 million equivalent from the domestic bond market, $55.5 million equivalent from the Kuwait Fund and Arab Fund for Social and Economic Development, $32.2 million equivalent in internally generated cash, $15.5 million equivalent in increased share capital and $45 million equivalent from this World Bank loan.

Date Approved: May 19, 1977 (IBRD)

NEPAL

AGRICULTURE: This IDA credit will help finance a four-year project for the construction of 63 tubewells to serve 7,500 hectares of land which are now limited to producing one crop annually during the monsoon season. The project will also include building power transmission systems to electrify the wells, constructing feeder roads, providing additional grain storage capacity, strengthening agricultural supporting services—particularly extension services and production credit—and completing a feasibility study for a tubewell project in adjacent areas and a study of water charges in Nepal.

Borrower: Kingdom of Nepal.

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NEPAL—Continued

Terms: $9.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $13.7 million equivalent.

Purpose & Benefits: The principal benefits from this project will be substantial increases of foodgrain production (mainly rice and wheat), increased foreign exchange earnings, better employment opportunities for approximately 22,500 inhabitants of the project area, and substantial increases in net farm income. At full development of the project, it is estimated that production of paddy will increase from the present 8,700 tons to 25,000 tons per annum, wheat from 900 to 16,500 tons, pulses from 170 to 300 tons and oilseeds from 80 to 200 tons. New crops of corn and potatoes are expected to add 400 and 2,500 tons of production respectively. Production of sugarcane is to remain at 5,000 tons, but cultivated on 100 ha. instead of the present 200 ha. Average annual per capita income in the project area will increase from the current $37 to $140 (equivalents). Farmers in the poorest groups are expected to have average per capita incomes of approximately $70 equivalent after payment of water charges. It is estimated that 3,400 tons of rice and 14,000 tons of wheat will be available for export and should yield about $1.7 million equivalent in net foreign exchange earnings. The economic rate of return on the project is estimated at 19 percent. Sensitivity analyses show that even with a 20 percent increase in project costs, a 20 percent decrease in benefits and a delay of one year in realizing benefits, the estimated rate of return would still be 11 percent. Intangible, but important, benefits will include the demonstration effect of the project and its institution-building and training aspects. Experience gained in implementing this project should help in its replication in other regions of the Nepalese Terai. Water from the tubewells in this project area will be potable and thus will help reduce the incidence of gastrointestinal diseases.

Date Approved: July 6, 1976 (IDA)

TECHNICAL ASSISTANCE: This credit will provide resources to fund technical assistance for preinvestment planning, feasibility and engineering studies, consulting and advisory services, and training for the staff of Nepalese Government agencies responsible for project planning and preparation.

Borrower: Kingdom of Nepal.

Terms: $3.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $4.0 million equivalent.

Purpose & Benefits: The major objective of this project is to develop a pipeline of projects suitable for financing by the Government and external agencies. This in turn should help Nepal make more efficient use of the domestic and external resources available to it for economic development. The project will also assist in enhancing the project preparation capabilities of Nepal's technical ministries and associated agencies, and, over the long run, reduce dependence on foreign help for these purposes. Resources from the credit are to be allocated to specific sub-projects as agreed between Nepal and the IDA. Sub-projects, which have not been specified in detail so as to maintain flexibility in implementation, are expected to fall primarily in the agricultural, agro-industrial and industrial sectors. Investment possibilities include: minor irrigation, horticulture, livestock, textiles and flour-milling.

Date Approved: September 7, 1976 (IDA).

HEALTH: This IDA credit will help improve and extend water supply facilities in the Kathmandu Valley, Pokhara, Birat-Kathmandu and Lalitpur. The project calls for the rehabilitation of four km. of existing distribution mains, about 5,000 service connections, 400 standpipes, 500 gate valves, and construction of 48 km. of new secondary distribution lines. Ten villages in the Kathmandu Valley are to receive about 29 km. of pipelines, about 6.5 km. of new mains and a new service reservoir of 500 m^3. At Pokhara the water distribution system will be extended by constructing 11 km. of pipelines and a new service reservoir of 500 m^3.

Borrower: Kingdom of Nepal.

Terms: $8.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $11.3 million equivalent.

Purpose & Benefits: Water supply, albeit of doubtful quality and inadequate quantity, reached only 400,000 inhabitants of the Kathmandu Valley in July 1976 and sewerage facilities served only about 27,000 people. After completion of this project in 1981 an adequate supply of safe water will be available to about 590,000 people (over 80 percent of the inhabitants) and sewerage facilities will reach more than 85,000. By 1985 the beneficiaries of the water supply systems are expected to number approximately 710,000 persons, or 96 percent of project area population. Improved health of the inhabitants of the project area and the reduction of river pollution are the principal benefits of this project. Improved sanitary conditions in the Kathmandu Valley and at Pokhara will also help the tourist industry, an important source of foreign exchange earnings for Nepal. This project is the least-cost solution to the problem of providing these services. Future water charges are expected to exceed the average incremental cost of water by 1981.

Date Approved: April 26, 1977 (IDA)

INTERMEDIATE FINANCIAL INSTITUTION: This IDA credit will be used to finance the foreign exchange costs of imported capital goods and services for Nepal Industrial Development Corporation (NIDC) sub-projects sponsored by private productive enterprises including activities in the manufacturing, agro-industry, construction, and tourism sectors.

Borrower: Kingdom of Nepal.

Terms: $4.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum.

Purpose & Benefits: This credit is expected to have significant impact on the development of the Nepalese industrial sector. The proposals being considered by the NIDC are closely in line with Nepal's policies for developing this sector and are consistent with the types of industrial development appropriate in that country. This project will help mobilize domestic resources for investment, increase foreign exchange earnings and savings, and generate new employment opportunities. The credit will also help strengthen NIDC as an institution—through organizational changes, improved appraisal and follow-up procedures and technical assistance—thereby enabling NIDC to play an increasingly effective role in development.

Date Approved: May 3, 1977 (IDA)

NICARAGUA

POWER: This project consists of building about 145 km. of 230 kV. single circuit transmission line on steel towers for the interconnection with Costa Rica; construction of about 9 km. of double circuit and 13 km. of single circuit 138 kV. transmission line to complete the Managua power ring; the construction, addition, and/or conversion of seven substations; the relocation of transformer capacity; and installation of circuit breakers and protective relay and metering equipment. The project will also include installation of switched and unswitched capacitors to supply reactive power, distribution lines, transformers, and connections, a national load dispatch center, and the installation of equipment to operate the Honduras-Nicaragua-Costa Rica interconnection.

Borrower: Empresa Nacional de Luz y Fuerza (ENALUF). *Guarantor:* Nicaragua.

Terms: $22.0 million equivalent World Bank loan. Term of 17 years with interest at 8.5 percent per annum. Total project cost: $32.4 million equivalent.

Purpose & Benefits: A rate of return for this project has been calculated on the basis of ENALUF's total investment program for the 1976–1980 period, rather than on the components of the project itself. (The project's physical works are the least-cost alternative.) Using 1976 tariffs as the measure of benefits, the rate of return on the program is estimated to be 13.1 percent. Sensitivity analysis indicates that this return would be reduced to 10.3 percent if investment costs are assumed to increase by 10 percent and benefits decline by 10 percent. If sunk costs incurred prior to 1976 are excluded, the equalizing discount rate increases to 16.2 percent. These discount rates are consistent with the probable opportunity cost of capital in Nicaragua and suggest that consumers, on the average, are now paying tariffs which reflect incremental costs. The actual economic rate of return is higher than these calculations indicate, however, since they do not include indirect benefits to industry, commerce and other large consumers whose contribution to production would likely be lower if they had to finance their own electric generating facilities.

Date Approved: April 12, 1977 (IBRD)

NIGERIA

AGRICULTURE: This agricultural project, to be carried out in the Plateau State of Nigeria during the period 1978 to 1982, involves physical infrastructure, support services and farm inputs, including 600 km. of feeder roads; construction of wells and an administrative center at Lafia; establishment of a seed multiplication farm; expansion of a training center providing expanded applied research capacity and establishment of a training program for project staff and farmers; establishment of an evaluation unit and construction of twenty Farmers' Service Centers to ensure adequate input supply and credit facilities and a market advisory service to farmers; the provision of veterinary services, improvement of local small livestock, and establishment of four grazing reserves and improvement of cattle trade routes; establishment of about 2,200 ha. of township fuelwood and pole plantations; establishment of four fishing lagoons and improvement and expansion of fishery extension services.

Borrower: Federal Republic of Nigeria.

Terms: $27.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $85.0 million equivalent.

Purpose & Benefits: The economic rate of return from total investment in this project is estimated at 23 percent. This high rate of return is consistent with comparable, on-going, projects in northern Nigeria and is due mainly to the introduction of low-cost technological innovations expected to result in significant crop yield increases. The direct benefit of the project will be an annual incremental increase of farm production (at full project development) of 92,000 tons of yams, 50,000 tons of cassava, 7,900 tons of rice, 8,900 tons of corn, 600 tons of melon, 4,800 tons of sorghum, 5,800 tons of cowpeas and 2,000 tons of benneseed. Additional fish catch is estimated at about 80 tons annually and incremental meat production at 8.8 tons per year. Overall, about 60,000 farm families are to benefit directly in the form of higher farm income and some 500,000 persons comprising the project area population, will benefit, directly or indirectly, from improved infrastructure facilities such as roads and water supplies. Other secondary, but largely unquantifiable, benefits include improved economic farm support services and the strengthening of agricultural, technical, managerial and planning capabilities.

Date Approved: June 9, 1977 (IBRD)

AGRICULTURE: This World Bank loan will help support an agricultural development project in the Benue State of Nigeria encompassing physical infrastructure, support services and farm inputs. Specific components include 1,300 km. of feeder roads, construction of 180 wells, establishment of a seed multiplication farm, expansion of a training center and training programs for project staff and farmers, construction of thirty Farmers' Service Centers to provide input supplies and credit facilities, veterinary services and improvement of local small livestock, establishment of about 1,000 ha. of township fuelwood and pole plantations, and establishment of fifteen fishing lagoons.

Borrower: Federal Republic of Nigeria.

Terms: $35.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $114.0 million equivalent.

Purpose & Benefits: The economic rate of return from total investment in this project is estimated at 27 percent. This return is consistent with similar projects in northern Nigeria and stems principally from the introduction of low-cost technology which is expected to lead to significantly increased crop yields. The direct benefit of the project will be an annual increase in farm production at full development of 92,000 tons of yams, 100,000 tons of cassava, 12,800 tons of rice, 26,100 tons of corn, 2,100 tons of melon, 3,400 tons of sorghum, 6,800 tons of cowpeas and 1,100 tons of benneseed. Fish catches are estimated at about 300 tons annually. Overall, about 150,000 farm families are to benefit directly through higher farm incomes, and all of the project area population (one million) will benefit, directly or indirectly, from improved infrastructure, including roads and water supplies. Since most of the additional production will be traded locally, foreign exchange savings and earnings from the project are estimated at a modest $9 million equivalent.

Date Approved: June 9, 1977 (IBRD)

OMAN

POWER & WATER: This project will provide consultant services for preparing a short-term (1977–80) and a medium-term (1981–85) program for identifying high priority investments needed for the development of electricity and water in the principal urban and rural growth centers of Oman. In addition, a broad master plan for priority long-term (1986–95) future project requirements is to be prepared, including recommended improvements in the legislative, structural, organizational, financial, procedural and operational aspects of the power and water sectors.

Borrower: Sultanate of Oman.

Terms: $1.5 million equivalent World Bank loan. Term of 10 years with interest at 8.2 percent per annum. Total project cost: $2.5 million equivalent.

Purpose & Benefits: The Oman Government's intensive development efforts have led to rapid economic growth in urban centers with consequent increased power and water demand. There is also considerable pressure to provide adequate sources of rural water supply in the rural regions (where most Omanis live). Under these circumstances, and given the financial constraints and competing development needs, steps must be taken to ensure adequate supplies of power and water based on priority and least-cost decisions. The Government has thus asked the World Bank to organize consultant studies to determine the short- and long-term needs for power and urban water of the country's urban and rural growth centers. The Omani authorities intend also that the consultant work include detailed engineering of projects identified as having priority for the 1977–80 period plus detailed feasibility studies of identified priority projects for the 1981–85 period. The Oman Development Plan, prepared with the aid of a Planning Team financed under an on-going World Bank Technical Assistance loan, envisages total expenditure of $365 million equivalent in these two sectors—about 15 percent of total planned investments. The consultants are also to make recommendations for improvements in legislation, structure, and procedures in the power and water sectors.

Date Approved: May 31, 1977 (IBRD)

TRANSPORTATION: This World Bank loan will help the Oman Roads Department establish effective and efficient routine highway maintenance procedures to sustain an efficient national transport network to serve present and forecast transportation demand. An important project objective is to help overcome the significant shortage at all staff levels of suitable trained personnel through a specific training program and on-the-job training. Major project components include the purchase of: maintenance equipment and spares, workshops and workshop equipment, fuels, oils and lubricants, survey and communications equipment and highway supplies. The training element will involve construction and equipment of classrooms and overseas and local training programs.

Borrower: Sultanate of Oman.

Terms: $15.0 million equivalent World Bank loan. Term of 15 years with interest at 8.2 percent per annum. Total project cost: $47.1 million equivalent.

Purpose & Benefits: Standards of maintenance on unpaved roads under the jurisdiction of the Roads Department are not satisfactory nor does this organization adequately maintain the paved network. This project is designed to protect the already substantial Omani investment in highways and improve maintenance capabilities in face of increasing traffic demand. The economic benefits of the project will accrue directly to the country as a whole through preservation of its investment and lowering of maintenance costs, to the trucking industry through reduced vehicle operating costs which will be passed down to consumers, and to a broad spectrum of income groups who rely on highway passenger transportation. The economic analysis of the maintenance portion of this project indicates benefit/cost ratios of 6:2 and 5:8 (allowing 15 percent and 20 percent, respectively, as the opportunity cost of capital in Oman). On the basis of savings in highway user costs, the maintenance component of the project is expected to yield an overall economic rate of return of more than 100 percent.

Date Approved: May 31, 1977 (IBRD)

PAKISTAN

INTERMEDIATE CREDIT INSTITUTION: This World Bank loan will help finance the foreign exchange costs of industrial projects carried out by private productive enterprises in Pakistan through the facilities of the Pakistan Industrial Credit and Investment Corporation Limited (PICIC). A study of Pakistan's textile industry will also be funded from the loan proceeds.

Borrower: Pakistan Industrial Credit and Investment Corporation (PICIC). *Guarantor:* Pakistan.

Terms: $25.0 million equivalent World Bank loan. Term of 15 years with interest at 8.9 percent per annum.

Purpose & Benefits: In 1975 PICIC's net profits after taxes amounted to Rs.29.4 million, as compared with Rs.38.0 million in 1974 and Rs.36.1 million in 1973. The lower 1975 profits arose because PICIC developed a number of relatively large problem accounts. After-tax profits as a percentage of average total assets, however, remained acceptable, at 1.3 percent compared with 1.7 percent in 1974. PICIC's capital structure has been improved through a capital increase and the settlement of its Bangladesh assets problem. The long-term debt/equity ratio is expected to remain at about 7:1 during the next five years or so and its debt/equity ratio, calculating subordinated loans as equity, will remain at about 6.6:1 or below the 7:1 maximum prescribed in its arrangements with the World Bank. The Government of Pakistan has nonetheless indicated that for as long as PICIC is not in a position to raise share capital, it will provide subordinated loans as needed to maintain PICIC's contractual debt/equity ratio below 7:1. PICIC is the major institution in Pakistan providing long-term financing for private industry. Because of its emphasis on export orientation, PICIC can play a significant role in assisting industry to meet the objectives of Pakistan's Five Year Plan. PICIC's disbursements over the last three years accounted for about 20 percent of private investment in the large and medium scale industrial sector. Between January 1973 and September 1975, PICIC approved loans and acquired shares and debentures valued at Rs.1.1 billion which accounted for 59 percent of total fixed investment in the projects assisted. PICIC estimates that the net annual foreign exchange earnings/savings from these projects will be about $80 million equivalent and the contribution to net value added will be about Rs.630 million. Estimated additional direct employment generated by PICIC-aided projects is about 15,500 with an average fixed investment cost per job created of about $12,000 equivalent. Of 64 projects financed between July 1973 and September 1975, *ex-ante* financial rates of return ranged from 11 percent to 33 percent (average 17 percent).

Date Approved: September 14, 1976 (IBRD).

EDUCATION: The project this IDA credit will help finance is designed to expand and improve primary and middle education (grades 1 through 8) in Pakistan by increasing the number of qualified teachers, particularly for children in rural areas, and to increase the number of personnel trained in agricultural and rural development. The project comprises: (a) improvement of basic education by the expansion, construction or reconstruction of 17 Teacher Training Institutes (TTI) for primary and middle stage teachers, the execution of the second phase of an adult education pilot project, and the carrying out of a study of future demand for female teachers; and (b) the improvement of agricultural education by expanding or rebuilding six Agricultural Training Institutes (ATI), remodeling and equipping the Sind Agricultural University at Tandojam, and carrying out of studies of training programs for irrigated agriculture and water management and of projected supply and demand for agricultural manpower.

Borrower: Islamic Republic of Pakistan.

Terms: $15.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $27.2 million equivalent.

Purpose & Benefits: Project expenditures on the Teacher Training Institutes will facilitate the expansion of enrollment in primary schools from the present level of 5.1 million to 7.5 million by 1985. It will also assist in the introduction of improved curricula. The pilot schemes for adult literacy are to seek to develop a comprehensive strategy for carrying out Government of Pakistan efforts to improve educational opportunities among the less developed regions and groups of the country. Assistance to the Agricultural Training Institutes will contribute to Pakistan's agricultural growth by enabling the Government to reduce the ratio of field assistants to farmers from the present 1:900 to 1:450 by 1986. Improvement of the Sind Agricultural University will enhance the quality of agricultural graduates in Sind, Baluchistan and Azad Kashmir. The Government's requirements for agricultural graduates in these regions are to be met through an output of about 1,300 graduates by 1986. Studies associated with this project are expected to identify further training needs and provide a basis for future educational investment in Pakistan.

Date Approved: January 25, 1977 (IDA)

AGRICULTURE: The proceeds from this World Bank Third Window loan will help finance the development of about 500 Village Livestock Associations (VLA) through intensified milk marketing and production services, improved animal health, artificial insemination and extension coverage, and a central training unit for field and VLA staff. The loan will also support the Livestock Development Department of the Punjab Provincial Government in producing foot and mouth disease vaccine, expanding artificial insemination services, and strengthening animal production research capacity.

Borrower: Islamic Republic of Pakistan.

Terms: $10.0 million equivalent World Bank Third Window loan. Term of 24 years with interest at 4.5 percent per annum. Total project cost: $19.7 million equivalent.

Purpose & Benefits: The benefits of this project include additional crop production in the project area through the use of more and better quality draft animals plus additional meat and milk production. About 60,000 village farmers, including 15,000 landless livestock owners, are to benefit from the project. Farm labor requirements will increase by 16 percent (6,000 man-years), and the income of landless laborers is expected to quadruple (to Rs.1,340) as a result of increased milk production. Over the long run, there will be annual production increments of about 50,000 tons of foodgrains, 6,000 tons of meat and 45,000 tons of milk. No problems are foreseen in absorbing the increased production of foodgrains. The project milk and meat marketing components are, however, vital since increased milk production requires sophisticated market infrastructure and meat exports depend on better processing facilities. Because tenancy agreements normally stipulate that livestock income is to accrue to tenants, tenant farmers should have particular incentives to participate in project activities. By increasing agricultural production, the project will also have additional indirect effects on Government revenues by permitting a reduction in the subsidy on imported foodgrains. The estimated economic rate of return for the project as a whole is 30 percent.

Date Approved: February 1, 1977 (IBRD)

AGRICULTURE: The proceeds of this IDA credit will help Pakistan finance: (a) restoration of irrigation, drainage and flood protection works; (b) restoration work on roads and railways and part of the irrigation, drainage and flood protection sectors; (c) provision of spare parts, assemblies and tools for the repair of Government-owned equipment required for this construction work; (d) provision of special equipment needed to increase output from existing Government-owned construction equipment; (e) provision of equipment to improve the effectiveness of Pakistan's flood forecasting and early warning system; and (f) provision of related technical services.

Borrower: Islamic Republic of Pakistan.

Terms: $40.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $92.2 million equivalent.

Purpose & Benefits: Exceptional circumstances justify providing assistance to Pakistan for flood restoration work for the second time in three years. The 1976 floods were unusually severe and completely unexpected. Available records indicated that floods of such mag-

PAKISTAN—Continued

nitude occurred on the average only once every 45 years. Flood damage restoration has been given the highest spending priority in Pakistan—unless the damage is restored, irrigated agriculture will degenerate and economic activity will decline sharply. Pakistan's investment effort is already straining that country's resources and much of this investment is such that expenditures can be cut back only at severe cost to the economy as a whole. The alternative course of additional deficit financing would exacerbate already acute inflationary pressures. The occurrence of catastrophic floods in 1973 and 1976, and heavy floods in 1975, highlight Pakistan's vulnerability to natural disasters. Although scant progress has been made in developing a comprehensive flood protection plan, the Government is fully aware of the seriousness of the problem and it is hoped that, building on work started under a 1974 project, suitable responses can be devised to the problems facing Pakistan in contending with floods.

Date Approved: February 22, 1977 (IDA)

TRANSPORTATION: This World Bank loan and IDA credit will help finance a two-year segment of Pakistan Railways (PR) 1977–1981 Investment Plan. It includes track, rail and sleeper renewal; civil works; line capacity works; terminal, workshop and marshalling yard facilities; locomotive re-engining; the manufacture of coaches and the conversion of freight cars. In addition, the project will also provide for a telecommunications and signalling scheme, imported spare parts for diesel locomotives and technical assistance and training.

Borrower: Islamic Republic of Pakistan.

Terms: $35.0 million equivalent World Bank loan. Term of 20 years at 8.5 percent interest per annum. $25.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $247.0 million equivalent.

Purpose & Benefits: The primary objective of this project is to assist the PR to improve its operational performance and, in particular, to permit the carriage of a substantially larger volume of freight traffic. Improvements in PR operations expected from plan investments and concurrent organizational changes will generate economic benefits in the forms of savings in operating costs, and the avoidance of diversion of traffic to road transport. This should make it feasible for PR to carry forecasted freight and passenger traffic with significantly less new investment than would be required in the absence of major operational improvements. The estimated economic return on this investment is about 24 percent. In addition, there will be non-quantifiable benefits in terms of savings of passenger and freight time, reduced inventories and improvements in the reliability and quality of rail service in Pakistan.

Date Approved: February 22, 1977 (IBRD and IDA)

AGRICULTURE: These World Bank loan funds will help finance the construction of a 1,725 tpd. urea plant, including an intermediate 1,000 tpd. ammonia plant at Goth Machhi, Province of the Punjab. The project will also include construction of a 50 km. pipeline to bring gas from the Mari field to the project site plus all essential auxiliary facilities.

Borrower: Fauji Agrico Fertilizer Company Limited (FAFCO). *Guarantor:* Pakistan.

Terms: $55.0 million equivalent World Bank loan. Term of 15 years with interest at 8.5 percent per annum. Total project cost: $259.8 million equivalent.

Purpose & Benefits: The estimated financial rate of return on this project as a whole is 19 percent before taxes or 12 percent after taxes. The economic rate of return is estimated at 24 percent. These rates of return are sensitive to changes in fertilizer prices, capital costs, delays in completing construction and the degree of capacity utilization. Even under the unlikely combination of the most adverse foreseeable circumstances, however, the returns remain at satisfactory levels. One important benefit of the project will be in the form of foreign exchange savings, estimated at $68 million equivalent annually. The project will also have significant benefits in terms of management training, assurance of fertilizer supply, and the development of a marketing organization. Project design is based on modern, commercially-proven, technology with technical risks minimized. The plant is to be built by an experienced engineering firm (incentives to minimize cost are provided) and will be managed and operated with the assistance of experienced partners with expert knowledge of local conditions. The Government of Pakistan has agreed to provide, on terms satisfactory to the World Bank, any funds to cover excess costs of completing the project. The plant is expected to be able to export profitably any surplus output which may develop.

Date Approved: April 12, 1977 (IBRD)

PANAMA

AGRICULTURE: This project is designed to increase the domestic supply of milk in Panama, thus reducing Panama's dependence on imported milk. The project is also consistent with other Panamanian rural development programs by providing financing and technical services for Government-sponsored settlements and for a Government-owned experimental farm. Specific components of the project include: (a) long-term financing for on-farm investments by small- and medium-sized producers, *asentamientos*, cooperatives, and other groups of farmers primarily dedicated to milk production and specialized dairy or beef/dairy herds; (b) long-term financing to assist the Integrated Development Program of Rio Hato (PRODEIRHA) (a newly-established State farm which serves as a production and training center for farmers); and (c) the provision of technical services.

Borrower: Banco Nacional de Panama (BNP). *Guarantor:* Panama.

Terms: $8.0 million equivalent World Bank loan. Term of 14 years with interest at 8.5 percent per annum. Total project cost: $20.0 million equivalent.

Purpose & Benefits: The overall rate of return for this project is estimated at 20 percent. The project will have direct balance-of-payments and fiscal effects. Since Panama is a net milk importer, the addition to domestic production from project-related investments will lead to substantial foreign exchange savings. At full project development, the estimated value of incremental milk, beef and breeding stock output (using 1976 prices), will be about $9.5 million equivalent per year and net foreign exchange savings will be about $6.2 million equivalent per year. A further project benefit to Panama will take the form of increased tax and fee collections which are estimated to be about $150,000 equivalent annually. The direct beneficiaries of the project will be about 1,500 families (approximately 7,600 persons), of which 355 families live on their own farms, 560 families live in 20 *asentamientos* or other collective groups, and the remainder are farm workers. Of the 1,500, about 1,300 of the beneficiary families are presently below the poverty line in Panama (defined as per capita family income of less than the equivalent of $200).

Date Approved: April 5, 1977 (IBRD)

FISHERIES: This project encompasses: (a) constructing five new steel shrimp trawlers and the rehabilitation of ten wooden trawlers; (b) the construction of ten new purse seiners; (c) relocation of six shrimp processing plants from Panama City to the new fishing port at Vacamonte; (d) the development of 75 ha. of fresh water fish culture in inland ponds and streams; (e) development of an oyster farming program; and (f) the provision of technical assistance for naval architecture, quality control standards for seafood processing, and an operational training program for ship captains.

Borrower: Banco Nacional de Panama (BNP). *Guarantor:* Panama.

Terms: $7.5 million equivalent World Bank loan. Term of 15 years with interest at 8.5 percent per annum. Total project cost: $12.6 million equivalent.

Purpose & Benefits: The economic rate of return for this project is estimated at about 15 percent. The Panamanian fishing industry, as a whole, will benefit through the increase in the efficiency of the fleet and the processing plants and through better utilization and conservation of fish resources. Average annual incremental production is expected to be about 57,000 metric tons of industrial fish, 134 metric tons of shrimp, 28 metric tons of oysters, and 243 metric tons of fresh water fish. The project will create about 200 new jobs and, by making new craft available to small independent shrimping operators, the project will support Panamanian Government objectives of keeping these operators active and preventing the concentration of the shrimping industry in the hands of a few processors and large companies. Moreover, the project will help regulate the growth of the fishing industry in Panama by maintaining a reasonable balance between fish resources and fleet capacity. The financial rates of return for the fishing vessels range from 22 percent to 40 percent; net earnings per vessel per annum are estimated at $33,368 equivalent for a new shrimp trawler, $26,698 equivalent for a rehabilitated shrimp trawler, and $73,080 equivalent for an industrial purse seiner. Farmers raising fresh water fish are expected to earn additional cash incomes of between $180 equivalent to $240 equivalent per annum while oyster farmers will earn additional cash incomes of about $250 equivalent per year. The investments in the shrimp plant relocation program will generate about $90,000 equivalent of annual cost savings and an additional $200,000 equivalent by providing a better quality export product (thereby reducing rejection rates at United States ports).

Date Approved: April 5, 1977 (IBRD)

POWER: This project consists of the Fortuna 255-MV. hydroelectric power plant which will have an estimated average annual generating capacity of 1,320 GWh. during normal-hydrology years and 1,155 GWh. during dry years. Components of the project comprise: (a) diversion works; (b) a rockfill dam; (c) a power tunnel, surge tank and penstock; (d) an underground powerhouse with three generating units of about 85 MW. each; (e) a tailrace tunnel; and (f) access roads, camp and related works. The Fortuna transmission system is also included in the project, consisting of the Fortuna switchyard, a high-voltage transmission line from the Fortuna plant to the David substation; and additional associated substation capacity.

Borrower: Instituto de Recursos Hidraulicos y Electrificacion (IRHE). *Guarantor:* Panama.

Terms: $42.0 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $253.6 million equivalent.

Purpose & Benefits: The rate of return calculated on the overall power investment program, taking into account the costs of required sub-transmission and distribution investments, is estimated at 17.7 percent. The actual economic rate of return for this project is likely to be somewhat higher than this since the benefits to industrial, commercial and other consumers, whose costs would be higher and output lower if they had to finance their own electricity generation facilities, should also be considered. The calculations also do not include benefits which cannot be measured by reference to electricity rates. The Government of Panama has authorized electricity rate increases to permit IRHE to cover a sizeable portion of its investment program from internally-generated funds. On this basis, it is expected that IRHE will be able to execute the project (in which the IDB and export suppliers are co-lenders) efficiently and on a financially sound basis.

Date Approved: June 28, 1977 (IBRD)

PAPUA NEW GUINEA

AGRICULTURE: This project will help settle 1,400 smallholders on about 5,600 ha. for oil palm cultivation. The program will provide the settlers with long-term credit, extension services and social and economic infrastructure, including feeder roads, housing, health, education and welfare facilities. The project will also establish a Government-owned transportation company to serve the smallholders. Not included in this project, but crucial to its success, is the concurrent establishment of a palm oil processing factory to be financed by the Government and the Commonwealth Development Corporation (CDC). The project also includes technical assistance to provide funds for the employment of expatriate personnel for the smallholder project and a consultant to establish related training programs.

Borrower: Independent State of Papua New Guinea.

Terms: $12.0 million equivalent World Bank loan. Term 20 years with interest at 8.7 percent per annum. Total project cost: $18.5 million equivalent.

Purpose & Benefits: The immediate direct benefits from this project will be twofold. First, significantly improved incomes and living standards will accrue to the 1,400 smallholders involved, all of whom would be given a firm base in the cash economy. The project will thus support the Government's rural development objectives (geographic dispersion and increased opportu-

PAPUA NEW GUINEA—Continued

nities). Settler costs per family are estimated at about $6,000 equivalent for the seven-year development period. This compares favorably with similar schemes undertaken in other countries. Second, the expansion of oil palm production should strengthen the agricultural sector and increase foreign exchange earnings. Papua New Guinea has an important comparative advantage in oil palm cultivation and this project, together with the nucleus estate, will bring into production some 5,600 ha. of presently unutilized but fertile land. At maturity the project area is expected to export some 42,400 tons of palm oil and 7,490 tons of palm kernel annually with a value of about $13.7 million equivalent. In addition to its direct benefits, the project will have significant linkage effects on regional development. It is estimated that the overall employment impact will amount to some 3,100 new jobs: smallholder development—2,100; Government services and transportation—300; secondary urban and rural development—about 700. The economic rate of return for the project is estimated at 14.5 percent.

Date Approved: October 19, 1976 (IBRD)

EDUCATION: This IDA credit will help finance the expansion of five educational institutions in the agricultural, health, primary and secondary teacher training, and technical fields. In addition, it will support planning and studies essential to long-term development of the education and training sector in Papua New Guinea, including an experimental program at five Rural Vocational Centers.

Borrower: The Independent State of Papua New Guinea.

Terms: $4.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $7.4 million equivalent.

Purpose & Benefits: Adequate skilled manpower is crucial to the economic growth and development of Papua New Guinea and this project will provide resources to several key institutions chosen because they can serve to supply the needed increase in trained manpower. The project calls for relatively modest physical facilities—one of its major aims is to rationalize the education system in several important fields which should, in turn, lead to significant savings in unit costs and increased student/teacher ratios. The newly-trained manpower can be quickly absorbed into the workforce, either in filling current unmet needs, or in replacing middle and upper level expatriate personnel upon whom the economy now relies heavily. While the expatriates provide excellent service in most cases, localization is desirable and has been given priority by the Government. Localization is considered particularly important in the cases of middle-level technicians and in the secondary teaching force, both of which are specific foci in this project. Providing basic and vocational educational opportunities in rural areas is an important vehicle for bringing the rural population into the modern monetized economy and the project-financed study on Integrated Rural Development and Community-Based Training will help the Government formulate a national development policy with proposals for coordinating Government services and rural training.

Date Approved: October 19, 1976 (IDA).

TRANSPORTATION: The project this IDA credit will help finance includes: (a) construction and improvement of three sections (about 68 km.) of the Highlands Highway between Goroka and Garnigl; (b) detailed engineering of about 317 km. of roads between Waterais and Togoba; (c) rural development project preparation studies in Enga and Chimbu Provinces; (d) a feasibility study for the construction and improvement of 63 km. of roads from Togoba to Wapenamanda; and (e) technical assistance and training for local civil engineering contractors.

Borrower: The Independent State of Papua New Guinea.

Terms: $19.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $27.5 million equivalent.

Purpose & Benefits: The longer term objective of this project is to increase output and incomes in the Central Highlands area which at the present time is only marginally exploited. This region has approximately 60 percent of the mainland population but only about one-fifth of Papua New Guinea's wealth. Despite very fertile soil which can grow a wide variety of cash crops, fruits and vegetables, and which is suitable for cattle grazing, the only important commercial crops now grown are coffee and tea. The all-weather road linking the region to the port of Lae is needed to realize and develop the agricultural potential of the area. The existing gravel-surfaced highway is frequently impassable during rainy weather and vehicles are often forced to wait hours or days for the road to be cleared. These delays are especially costly for vehicles carrying the perishable goods which constitute the cash crops of Highland smallholders. This project will reduce transportation costs and permit the use of larger, more efficient, vehicles. It will also help reduce fuel consumption and wear and tear on vehicles. Most of these savings are to be passed on to shippers since there is sharp competition in the local transportation industry. Based solely on savings in vehicle operating costs, the economic rate of return for the project is estimated at 27 percent.

Date Approved: January 25, 1977 (IDA)

PARAGUAY

EDUCATION: This World Bank loan and IDA credit will help support Paraguayan Government efforts to extend educational opportunities to children and adults in rural areas. Emphasis will be placed on improving the quality and efficiency of the education system by expanding textbook and teaching material production and by upgrading the skills of teachers and supervisors. Specifically, elements in the project include the establishment of 83 rural community learning centers, construction of 77 associated primary schools, the provision of functional buildings and equipment for workshops and laboratories for five lower secondary schools, expansion of two existing multilateral secondary schools with workshops and laboratories, in-service training for teachers, school directors and supervisors of project institutions, and the printing of materials for the production of textbooks and teaching guides for rural schools.

Borrower: Republic of Paraguay.

Terms: $8.0 million equivalent World Bank loan. Term of 17 years with interest at 8.7 percent per annum. $4.0 million IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $17.5 million equivalent.

Purpose & Benefits: The improvement and expansion of rural education facilities in Paraguay under this project is expected to yield important benefits. By helping to educate the rural population at primary and secondary levels, the project will assist in increasing future employment opportunities for members of the lowest income groups. In addition, by expanding facilities in colonization areas the project will also contribute to meeting the Government's objective of doubling rural family incomes within the next ten years. About 46,000 children (20 percent of the rural 7 to 12 age group) are to benefit from the rural community learning centers and associated rural primary schools. Completion of the associated schools under the project constitutes an economic approach to community self-help, encouraging parent and teacher participation in completing schools that have been started but are unfinished because of resource constraints. About 2,000 rural teachers (90 percent of the unqualified rural teachers) are to be given upgrading courses and every rural primary school student is to have a textbook in each main study area. In addition, about 100 directors of rural community learning centers will be trained in school supervision techniques and nearly 8,000 secondary school students (10 percent of national enrollment) will benefit from the lower secondary schools to be built and equipped under the project. The technical assistance to be included in the project will contribute substantially to the improvement of national education planning, financing and administration.

Date Approved: December 7, 1976 (IBRD and IDA)

AGRICULTURE: The proceeds of this World Bank loan will help finance the second stage of the Paraguayan Government's rural development program in the Itapua area. Project components include: (a) a credit program to cover the on-farm investment and incremental working capital needs of low-income farmers in the land settlement areas; (b) construction of 238 km. of earth roads and about 100 km. of all-weather roads; (c) construction and equipping eight health posts, two health centers, and upgrading two existing health centers, and training of field technicians; (d) building, furnishing and equipping two community centers; and (e) related technical assistance.

Borrower: Republic of Paraguay.

Terms: $22.0 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $42.8 million equivalent.

Purpose & Benefits: This project is designed to help diffuse technologies, already tested elsewhere in Paraguay, but which are not readily accessible to small farmers. At full project development, added farm production generated by the project will be equivalent to 24 percent of Paraguay's 1975 wheat production, 10 percent of soybean production, and about 2 percent of bean, cassava and maize production. Given Paraguay's comparative advantage in the production of oil seeds, it is likely that soybeans and sunflower seeds will be significant export crops. Incremental production of cereals is to be consumed domestically. The social and economic benefits of this project will exceed quantifiable magnitudes because substantial benefits will be derived from the social infrastructure and services to be provided in the project area, which has considerable potential for increasing food production in Paraguay. The project supports Government efforts to aid low-income farmers and an estimated 12,000 families (about 60,000 people) will benefit directly from these investments at a cost of about $2,200 equivalent per farm family. The project overall rate of return is estimated at 14 percent. The financial rate of return to farmers is estimated at 29 percent for farmers with 20 ha. units and 19 percent for farmers with 40 ha. units. In addition, the project will have significant institution-building impact in terms of strengthening both the farm credit institutions and the National Council for Social Progress in planning and coordination of rural development activities. The project will also help improve land tenure system through a re-titling program on 200,000 ha. of recently expropriated land.

Date Approved: May 10, 1977 (IBRD)

INDUSTRY: This project is aimed at helping rehabilitate the Banco Nacional de Fomento (BNF) and at expanding the availability of industial credit financing to increase employment and the value-added content of Paraguay's primary production. About $9.8 million equivalent of the World Bank loan proceeds will be used by BNF to make sub-loans to finance the foreign exchange component of industrial sub-projects during the period 1977 to 1981. The remainder, about $250,000 equivalent, will be allocated for the improvement of communications between BNF and its 38 widely-scattered rural branches.

Borrower: Republic of Paraguay.

Terms: $10.0 million equivalent World Bank loan. Maximum term of 15 years with interest at 8.2 percent per annum.

Purpose & Benefits: The technical assistance and financial rehabilitation programs included in this project will enable the BNF to maintain its role as the primary source for development finance in Paraguay. Its credit program is needed to meet the industrial sector targeted annual growth rate of 6 to 7 percent during the 1977–1981 period. Sub-projects to be financed are expected to generate about 200 new jobs at an average investment cost of about $10,000 equivalent per job. Indirect employment benefits and the impact of sub-projects on Paraguay's balance-of-payments will also be substantial. About 60 percent of the loan proceeds are expected to be lent to exporting and tourism enterprises and the remainder to import-substitution enterprises. Total exports generated after full implementation of subprojects are projected to amount to about $12 million equivalent, with net foreign exchange gains of about $8.5 million equivalent annually. The average economic rate of return on sub-loans is estimated to be about 20 percent. To help BNF managment meet its objectives the World Bank will allocate sufficient manpower to monitor operations closely and a performance review is scheduled prior to disbursement of the final $6.0 million equivalent of the loan.

Date Approved: May 10, 1977 (IBRD)

PERU

INDUSTRY: This World Bank loan will help cover the foreign exchange costs of manufacturing and processing projects which will have favorable impact on Peru's balance of payments. Beneficiaries will comprise mostly medium and large enterprises (including State owned, reformed private, private and Social Property Enterprises) but no more than 30 percent of the loan ($10.5 million equivalent) is to be re-lent to Social Property Enterprises because of the general inexperience associated with this form of self-managed enterprise. Sub-loans to Social Property Enterprises will require specific prior World Bank approval but a "free-limit" of $500,000 is to apply to all other types of sub-projects.

Borrower: Corporation Financiera de Desarrollo (COFIDE). *Guarantor:* Peru.

Terms: $35.0 million equivalent. Term of 17 years with interest at 8.7 percent per annum.

Purpose & Benefits: The project will assist in improving Peru's balance of payments and will generate additional production and employment by financing between 35 and 50 development projects in a wide range of productive sub-sectors. Guidelines for calculating economic rates of return require special justification for sub-projects with a return below 10 percent. It is also hoped that the systematic economic tests to be used in project selection will spread more widely in COFIDE and among the other Government agencies. Uncertainties currently prevail in Peru's industrial sector because of evolving institutions and policies. Two provisions of this loan are, however, specifically designed to insulate the project from financial risk. A Fund arrangement calls for operational and financial provisions to protect the project to a degree from any significant changes in COFIDE's future role. There is also the Peruvian Government's explicit financial backing which will assure that COFIDE will continue to be a financially viable institution even if it is transformed into a holding company for large State-owned enterprises. The limited experience with the Social Property concept to date is taken into account through the requirement for prior World Bank review of all sub-projects to Social Property enterprises and through the limit on total lending to these companies.

Date Approved: December 28, 1976 (IBRD)

IRRIGATION: This project includes: (a) reclamation of about 19,000 ha. of land, now seriously affected by salinity, in six coastal valleys of Peru; (b) rehabilitation and/or construction of main and secondary irrigation and drainage systems for about 33,000 ha. of land in these valleys; (c) improvement of operation and maintenance services for the entire irrigated area in the valleys (about 68,300 ha.); (d) improvement of agricultural supporting services; and (e) preparation of feasibility studies for similar projects in other coastal valleys.

Borrower: Republic of Peru.

Terms: $25.0 million equivalent World Bank loan. Term of 17 years with interest at 8.5 percent per annum. Total project cost: $40.9 million equivalent.

Purpose & Benefits: The principal objective of this project is to increase agricultural production at low cost and within a relatively short time frame. This will provide higher earnings and improved living conditions for about 4,000 families in the area (19,000 ha.) to be reclaimed and for another 13,200 families in the remaining 49,300 ha. which is to benefit from the project. It is expected that of the 4,000 families to receive primary benefits from the project, about 2,500 families currently have land incomes of less than $200 equivalent per capita (considered to be the Peruvian poverty income level in 1975). Of the 13,200 families to benefit from minor improvements under the project, 9,000 families currently have incomes from the land below the poverty income level. Additional production of cotton, grains, fruit and vegetables as a result of the project are expected to be valued at the equivalent of $13.2 million annually at full project development, with a net balance-of-payments gain of $11.3 million equivalent annually from increased exports of cotton fiber and sugar, reduced imports of grain and increased imports of project inputs such as machinery, fertilizers, and chemicals. The economic rate of return for this project is estimated at approximately 18 percent.

Date Approved: April 12, 1977 (IBRD)

PHILIPPINES

TRANSPORTATION: This project includes construction and improvement of 10 national road sections totaling about 500 km. and 16 sections of minor roads totaling about 230 km.; implementation of the first phase of a road maintenance program on Luzon Island comprising construction and enlargement of base and area workshops, the procurement of road maintenance equipment, tools, spare parts and components; and consulting services for road construction, feasibility studies, detailed engineering, and institution-building.

Borrower: Republic of the Philippines.

Terms: $95.0 million equivalent. Term of 20 years with interest at 8.7 percent per annum. Total project cost: $196.0 million equivalent.

Purpose & Benefits: Construction and improvement of national roads and reconstruction of minor roads under this project is in support of Philippine Government efforts to build and improve about 25,700 km. of roads during the Investment Program covering the period 1977 to 1980. Feasibility studies suggest that for most road sections the optimum first stage of improvement is to pave or gravel surfaces on present alignments with provision made for widening and better drainage. The approach of minimizing and phasing investments should make it possible to satisfy heavier transport demand at lower cost. Direct benefits of the project include substantially reduced costs for moving goods and people plus easier access to certain isolated areas of considerable economic development potential. Savings in vehicle operating costs on improved national roads are expected to range from 15 to 53 percent and on minor roads from 27 to 56 percent. The major roads in the Visayas region will support the mining activities on Cebu, sugarcane processing on Panay and Negros as well as other agricultural, trade and service activities. The national roads on Mindanao are to service one of the most rapidly growing areas in the Philippines which has great potential for increased production of rice, corn, sugarcane, livestock and timber. The minor roads in Visayas and on Mindanao, will help open up isolated areas with dense population or potential for new rural settlements. The economic rates of return for each national road section have been calculated separately and vary from 18 to 36 percent.

Date Approved: December 23, 1976 (IBRD)

IRRIGATION: This project involves the rehabilitation of four existing National Irrigation Administration (NIA) irrigation and drainage systems serving a total area of about 22,000 ha., the construction of new irrigation and drainage facilities for about 2,700 ha. of rainfed rice land, the construction of a project headquarters building, technical assistance to NIA for further studies on expanding the project, the procurement of vehicles and equipment, and training programs.

Borrower: Republic of the Philippines.

Terms: $15.0 million equivalent World Bank loan. Term of 20 years with interest at 8.5 percent per annum. Total project cost: $34.0 million equivalent.

Purpose & Benefits: This project contributes to the Philippine Government objectives of attaining self-sufficiency in rice, improving the productivity and income of small farmers and promoting balanced regional development. The project will permit improved water control and better drainage and provide necessary agricultural supporting services to bring about an increase in rice yields and production on 24,700 ha. of land currently dependent on run-of-the-river irrigation and rain-fed cultivation. Total paddy production in the project area is expected to increase from the current 80,000 tons to 147,000 tons per annum at full project development. About 3,500 full-time jobs are to be provided and 12,000 farm families and 2,000 landless labor families (about 80,000 people) will benefit directly from the project. Per capita farm income in the project area is expected to increase, in real terms, from $45 to $135 at the present time to $110 to $390, compared to projected Philippine national average per capita GNP of $550 by 1985 (equivalents). The project will also give farmers increased access to markets through the improved network of roads to be built along the canals and drainage system during construction. The estimated economic rate of return for the project is about 20 percent. When fully developed, the project will lead to net foreign exchange savings of about $9 million equivalent annually.

Date Approved: February 1, 1977 (IBRD)

EDUCATION: This project consists of: (a) civil works, procurement of furniture and equipment and technical assistance for the College of Forestry and the Department of Animal Science of the University of the Philippines, the College of Veterinary Medicine, the Visayas State College of Agriculture, the Philippine Training Centers for Rural Development; and (b) technical assistance: fellowships to strengthen the technical and management capabilities of the staff of the Education Development Projects Implementing Task Force, the Secretariat of the National Governing Board and the Technical Panel in the Department of Education and Culture.

Borrower: Republic of the Philippines.

Terms: $25.0 million equivalent World Bank loan. Term of 20 years with interest at 8.5 percent per annum. Total project cost: $45.3 million equivalent.

Purpose & Benefits: This project is designed to strengthen Philippine agricultural education institutions and bring about significant qualitative improvements in agricultural education and training programs. This will help the Philippine Government meet agricultural sector manpower requirements and thus support the fundamental objective of increasing agricultural production. Assistance for facilities, equipment, and staff development in agriculture, forestry, animal science, and veterinary medicine is expected to produce greater numbers of professionally qualified graduates in these fields. The help to be given to the Visayas State College of Agriculture (VISCA) will provide a third major region of the Philippines with an agricultural college to supply manpower and technical assistance for sound regional development. With the assistance to be provided under this project the beneficiary institutions are expected to be able to provide the following percentages of projected annual national manpower needs during the period 1976 to 1985: College of Forestry, 25 percent; College of Veterinary Medicine, 60 percent; Department of Animal Science, 40 percent; and VISCA, 20 percent (regional needs). Even with the project, sizable manpower deficits will remain as a consequence of the time lags involved in increasing the output of well-trained graduates. The project represents, however, the maximum feasible rate of expansion, taking into account the urgent need for quality improvement.

Date Approved: March 1, 1977 (IBRD)

AGRICULTURE: This World Bank loan will help finance an integrated agricultural development program with credit, equipment and training elements. Medium- and long-term credit will be extended by rural banks and stock savings and loan associations to farmers and rural entrepreneurs to finance investments in farm mechanization, light transportation, coastal and inland fisheries, small-scale livestock development, and cottage and agro-industries. These investments are expected to include items such as tractors, power tillers, small irrigation units, portable threshers, light trucks, small coastal fishing boats, and small-scale poultry, pig and cattle breeding and fattening projects. The training component comprises programs for the staff of the Department of Rural Banks and Savings and Loan Associations, and rural banks and savings and loan associations. An Agricultural Machinery Testing, Evaluation and Standardization Project at the University of the Philippines at Los Banos is also to be built and equipped as part of this project.

Borrower: The Central Bank of the Philippines.
Guarantor: Republic of the Philippines.

Terms: $36.5 million equivalent World Bank loan. Term of 15 years with interest at 8.5 percent per annum. Total project cost: $91.3 million equivalent.

Purpose & Benefits: Investments made under the project will lead to substantially increased production of several agricultural commodities (rice, corn, sugar, poultry, pork, beef and fish products) which will generate additional incomes for small farmers and improve nutritional standards in rural areas. Investments in cottage and agro-industries will expand production of a range of small capital and consumer goods for domestic and export markets, while the transportation and farm machinery investments will provide needed services in rural areas. The value of annual incremental production generated by the project at full development is estimated at about $50 million equivalent and the financial rates of return on sub-project investments range from 13 percent to more than 100 percent. The weighted average economic rate of return for the project as a whole is estimated to be 21 percent. Investments financed under this project will create about 10,600 new jobs directly as well as substantial additional indirect employment. The majority of these employment opportunities will be unskilled jobs and therefore available to the lowest income groups in rural areas. The project will also lead to net foreign exchange savings of about $9 million equivalent annually. The project has been designed to ensure, insofar as possible, that the largest feasible proportion of benefits accrue to smaller borrowers and the rural poor in the Philippines.

Date Approved: April 5, 1977 (IBRD)

AGRICULTURE: This irrigation improvement project includes: (a) rehabilitation of 22 existing National Irrigation Administration (NIA) irrigation systems serving a total area of about 27,600 ha., construction of new irrigation drainage and road facilities for about 21,800 ha. of rainfed land and construction of project-related buildings and procurement of vehicles and equipment; (b) a schistosomiasis control program involving improvement and construction of drainage facilities covering an area of about 20,000 ha., construction of footbridges on irrigation and drainage channels, provision of a health education program in all schools and health centers in 21 disease-affected municipalities, and establishment of a treatment program; and (c) a land consolidation project in Ilocos to determine the feasibility of introducing consolidation in an area of highly fragmented small farms plus an on-farm facilities study to determine the optimum density of terminal on-farm facilities best suited to very small holdings.

Borrower: Republic of the Philippines.

Terms: $50.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $107.2 million equivalent.

Purpose & Benefits: This project will help increase crop yields on about 49,400 ha. currently dependent on run-of-the-river irrigation and rainfed cultivation by providing better water supplies, improved drainage and necessary agricultural support services. At full agricultural development (1987) incremental paddy production is expected to be about 325,000 tons compared to 121,000 tons at the present time. Annual per capita incomes in the project area, which now vary from $45 to $100 equivalent, are expected to increase to between $135 and $380 equivalent by 1987. Approximately 240,000 persons, including families of landless laborers will benefit directly from the increased production ascribable to this project. Assuming a 50-year project life and a five-year construction period, the economic rate of return for this project is estimated to be 20 percent.

Date Approved: May 3, 1977 (IBRD)

WATER SUPPLY: The principal objectives of this World Bank-supported project are to help the Philippine Government expand and improve water supply in several provincial cities, develop a first stage sewerage and sanitation program in Metropolitan Manila, and train staff to supervise water supply programs in rural areas. The project will play an important role in preventing the spread of gastroenteritis and other water-related diseases which might otherwise continue to debilitate the working population and generally retard economic growth.

Borrower: Republic of the Philippines.

Terms: $23.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $38.3 million equivalent.

Purpose & Benefits: This project will assist the Government in expanding several water supply and sewerage programs which are badly needed to improve health standards and living conditions. The water supply component is designed to improve water supply systems which presently suffer from severe leakages, unreliable service, inadequate disinfection and poor maintenance. Problems in six provincial water districts will be attacked by improving institutional efficiency, extending water supply services, and training staff to design, operate, and maintain water systems. The total service area of the six systems to be involved in the project will increase from about 3,650 ha. to 9,670 ha., and the population served from 155,000 in 1977 to 373,000 by 1985. Without this project it is likely that gastroenteritis and other water-borne diseases will continue to be a serious problem and the mortality and morbidity rates could be expected to rise. Taking revenues from water charges as a measure of project benefits, the incremental economic rates of return for the six cities range from 3 percent to 11 percent, with an overall average of about 7 percent.

Date Approved: May 3, 1977 (IBRD)

RURAL DEVELOPMENT: This World Bank supported project is designed to strengthen both the Department of Agrarian Reform (DAR) coordinating role and specialist services in planning, land allocation and settlement design as well as directly to involve line agencies in developing agricultural services and infrastructure. In an effort to provide a practical and replicable frame of reference for a revitalized land settlement program, three existing settlement areas in Agusan del Sur and Bukidnon in Mindanao, and Capiz in the Visayas are to receive intensive assistance to upgrade physical infrastructure and existing levels of agricultural and other services.

Borrower: Republic of the Philippines.

Terms: $15.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $32.6 million equivalent.

Purpose & Benefits: The principal objective of this project is to help define policies and develop programs and procedures to enable the Philippine Government to make the best use of the remaining public land suitable for settlement by small farmers. Incremental project outlays (all data in dollar equivalents) per family over the five-year period of the project are estimated to be $2,200 in Agusan, $1,200 in Bukidnon, and $800 in Capiz and recurrent costs at full development will range from $140 equivalent per family in Agusan to $30 equivalent in Capiz. Per capita incomes (including non-farm income) on typical-size farms are expected to increase, through higher production and productivity, from about $40 equivalent to $160 equivalent at full development in Agusan, from $60 equivalent to $105 equivalent in Bukidnon, and from $60 equivalent to $150 equivalent in Capiz. The project is expected to benefit directly some 15,000 poor farmers (about 90,000 people) and will increase demand for on-farm labor in the settlement areas. At full project development, annual incremental rice production will be on the order of 37,000 tons, corn production 26,000 tons, sugar 15,000 tons and abaca fiber 4,400 tons. The economic rate of return for the project is estimated at 17 percent in

Agusan, 31 percent in Bukidnon, and 41 percent in Capiz. The overall weighted average economic rate of return for the three project settlement areas is 28 percent.

Date Approved: May 17, 1977 (IBRD)

POWER: The power project this World Bank loan will help finance comprises: (a) expansion of the Luzon transmission system involving about 1,360 km. of 230 kV. and 69 kV. transmission lines and the installation of substations with a total capacity of 225 MVA; (b) beginning of the first stage of establishing a communication system and control center in Luzon; (c) support for National Power Corporation (NPC) training activities; and (d) provision of consultants services for management improvement and a tariff study.

Borrower: Philippines National Power Corporation (NPC).

Terms: $58.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $92.0 million equivalent.

Purpose & Benefits: Electricity consumption in Luzon has grown steadily over the past decade and the rate of household electrification rose from 35 percent in 1970 to 46 percent in 1975. Most of those with electricity service live in central Luzon (including the Manila metropolitan area), however, and in the northern and southern sections of the island only 15 percent of households have electricity, which is provided largely by small, self-generating utilities which operate only for a limited period daily and at high cost. To rectify the unbalanced situation, the National Electrification Administration (NEA) has embarked on a total electrification program, the success of which depends heavily on the availability of NPC power supplies. With the completion of this project, nearly all of Luzon will be covered by the NPC transmission grid and forty additional large industries are expected to be connected to the grid by 1981. The project thus will contribute substantially to the Philippine electrification and industrialization programs by providing low cost and reliable power supplies throughout Luzon. Each of the fifty transmission subprojects involved is either the least-cost, or the only, alternative available. The basic design has been standardized by NPC to minimize engineering, construction and maintenance costs. Since the project is a time-slice of the NPC transmission expansion program in Luzon and is part of the generation-transmission-distribution chain of power supply, it is very difficult to quantify benefits attributable directly to the project. Therefore, an internal rate of return calculation has been made on the basis of the overall NPC investment program in Luzon for the period 1977–82. The internal rate of return on this basis is estimated to be at least 10 percent.

Date Approved: June 14, 1977 (IBRD)

PORTUGAL

TRANSPORTATION: This World Bank loan will help support: three years of a five-year program to improve roads in the Lisbon region; the purchase of highway maintenance, workshop and engineering equipment to improve routine maintenance of roads in the region; the construction of a 14.3 km. two-lane bypass road; and technical assistance for road, railway and multi-modal planning.

Borrower: Republic of Portugal.

Terms: $24.0 million equivalent. Term of 15 years with interest at 8.7 percent per annum. Total project cost: $49.0 million equivalent.

Purpose & Benefits: The objective of the technical assistance component of this project is to assist the Government of Portugal to initiate integrated national transport planning as a whole and to improve modal transport planning for highways and railways. The training component will reinforce Portuguese administrative and planning capabilities. The road rehabilitation program is designed to reduce transport costs primarily in the Lisbon region. In this region, as elsewhere in Portugal, many highways have deteriorated to the point where reconditioning is needed to make it possible to apply a "normal" (regular) amount of maintenance effort. Some of the roads, in fact, even with intensive maintenance, are expected to break up under present traffic loads unless they are completely rehabilitated. Benefits from rehabilitation include not only savings in vehicle operating costs but also savings in ordinary road maintenance costs. The road maintenance program will improve highway maintenance capabilities which are currently limited in terms of the demand engendered by growing traffic and an extensive highway network, much of which is in poor condition. Routine maintenance is expected to have an overall economic rate of return of about 50 percent. The overall economic return for the three quantifiable elements of this project (rehabilitation, maintenance and construction) will be a minimum of 21 percent. Furthermore, the rehabilitation and maintenance segments will generate additional benefits in terms of introducing basic methods and techniques for periodic and routine maintenance which may be extended later throughout the country.

Date Approved: October 19, 1976 (IBRD).

INDUSTRY: These World Bank loan funds will help finance the foreign exchange costs of imported or locally procured or produced equipment for investments in Portugal's industrial sector by public and private enterprises.

Borrower: Banco de Fomento Nacional (BFN). *Guarantor:* Portugal.

Terms: $50.0 million equivalent World Bank loan. Term of a maximum of 15 years with interest at 8.2 percent per annum.

Purpose & Benefits: Portugal is currently attempting to address many problems arising from past neglect of some sectors and discriminatory preferences for others. In the process of developing new programs, however, it is recognized that industrial growth remains one of the most important elements to effective revival of the economy and increased investment plus improved management of industry are among the first steps being taken in this revitalization effort. The BFN, with strong Government ties and good relations with the business community, is particularly well suited to help achieve these goals. It is committed to an active role in implementing the Government's plans in the industrial sector and in addressing the two key problems faced by the economy—high unemployment and an elevated balance-of-payments deficit. This loan will contribute to the achievement of these objectives through a resource transfer which can attract other external lenders and also through the financing of industrial projects expected to show high foreign exchange earnings/savings potential. The application of improved appraisal techniques, including economic rate of return calculations, will be a major step forward toward assuring sound allocation of limited foreign exchange resources. In addition, the assistance to small and medium enterprises, which make up the majority of applications received by BFN, is likely to have a larger employment impact at a lower cost per job created (about $20,000 equivalent, over recent years) than might be the case for larger, more capital-intensive, enterprises.

Date Approved: May 24, 1977 (IBRD)

ROMANIA

IRRIGATION: This World Bank loan will help finance the construction of irrigation infrastructure and related facilities to serve a land area of about 146,500 ha. in Eastern Romania. Installations include: (a) a floating pumping station and seven fixed pumping stations; (b) a system of concrete-lined main, branch and distribution canals; (c) about 115 pressure pumping stations and 2,760 km. of distribution pipeline; (d) 17 surface drainage networks and 23 related pumping stations to serve about 82,350 ha. and sub-surface drainage networks to serve another 14,400 ha.; (e) portable furrow and sprinkler irrigation equipment, operation and maintenance equipment, and farm machinery; (f) 240 km. of 110 kV. power lines; and (g) land leveling works on about 40,000 ha., soil erosion control works on about 6,100 ha., and windbreaks to protect about 38,600 ha.

Borrower: Banca Pentru Agricultura Si Industrie Alimentara. *Guarantor:* Romania.

Terms: $60.0 million equivalent. Term of 15 years with interest at 8.5 percent per annum. Total project cost: $195.0 million equivalent.

Purpose & Benefits: This project is designed to aid Romanian efforts to increase and stabilize agricultural production through irrigation and related farm development. It is expected to lead to an increase in the gross value of output in the project area to a relatively stable $67.5 million equivalent annually (an increase of 142 percent), as a result of an increase in the area available for production, a 10 percent increase in cropping intensity, and increases in crop yields. The project will also help reduce underemployment in the area and increase labor productivity by about 250 percent. Nearly 41,200 members of cooperatives and 16,200 employees of State farms are to participate in the project and, while they will not share directly in the benefits of the project (which accrue to the State) since incomes are controlled in Romania, they will benefit indirectly as project benefits flow back to the population at large over a period of time through increased public services and general compensation packages. It is expected that direct and indirect collections from ultimate beneficiaries of the project will permit cost recovery of about 16.3 percent annually.

Date Approved: February 15, 1977 (IBRD)

INDUSTRY: This project comprises engineering, construction and related services for: (a) a new fully-automated production line with an annual capacity of 5.5 million bearings; (b) modernized and expanded production facilities with an annual capacity of 28 million bearings; and (c) modernized and expanded production facilities for forgings, rings, balls, rollers, retainers and other services and equipment needed to support the bearing plant.

Borrower: Banka de Investitii. *Guarantor:* Romania.

Terms: $38.0 million equivalent World Bank loan. Term of 13 years with interest at 8.2 percent per annum. Total project cost: $93.1 million equivalent.

Purpose & Benefits: Romania's advantages in developing a competitive bearings industry lie in low labor costs, long-term production planning, and the absence of domestic marketing costs (additional savings). A relatively high portion of this bearing plant output is expected to be sold domestically or through long-term bilateral trade arrangements. The project will also lead to substantial foreign exchange savings, an item of particular importance to the Romanian economy. These foreign exchange savings are estimated at about $49 million equivalent per annum after the project has been completed. The project is to create about 500 additional jobs and generate additional State budget revenues of about $17.5 million equivalent per year after foreign debt service. As a result of the project, the quality of Romanian bearings will be substantially increased, thereby improving their competitiveness on world markets. Indirectly, the output of the plant will improve the quality of machinery, machine tools, automobiles and other industrial goods in which bearings play a critical part. The economic rate of return for the project is estimated at 15.6 percent.

Date Approved: May 26, 1977 (IBRD)

INDUSTRY: This is a project to construct a new glass fiber plant at Bucharest. The plant will produce 6,000 tons per year (tpy) of continuous "E" glass fiber in the form of roving and yarn and includes a weaving and finishing plant to convert 1,270 tpy into woven roving, fabrics, tapes and braided tubes. Production not consumed by the weaving plant (4,730 tpy) is to be sold as roving and yarn.

Borrower: Banka de Investitii. *Guarantor:* Romania.

Terms: $18.3 million equivalent World Bank loan. Term of 15 years with interest at 8.2 percent per annum. Total project cost: $43.6 million equivalent.

Purpose & Benefits: This project provides for the expansion of Romanian glass fiber production capacity to supply rising local demand. The project will also introduce new technology in the production of glass fiber over a five-year period after plant start-up. At full capacity this project is expected to yield net annual foreign exchange savings of about $12 million equivalent. Based on world market prices and production costs comparable to international standards, the project has an economic rate of return of 16.5 percent. Since the output of the new plant will be exclusively utilized to substitute for imports there are no market risks and the training programs to be established should ensure that the plant will achieve the specified quantitative and qualitative production program.

Date Approved: June 7, 1977 (IBRD)

INDUSTRY: This project involves construction of a new polyester plant in Gimpulung-Muscel (district of Arges) to produce 31,500 tons per year (tpy) of polyester staple, tow and tops and 15,200 tpy of polyester chips. Components include: (a) polymerization, spinning and drawing sections to produce 31,500 tpy of polyester staple fiber; (b) facilities to produce 15,200 tpy of polyester chips to be processed further in other Romanian plants; (c) facilities to convert 5000 tpy of wool-type tow to tops; (d) infrastructure and related installations for power and steam generation, raw material and product transportation, handling and storage; and (e) extensive maintenance and laboratory facilities.

Borrower: Banka de Investitii. *Guarantor:* Romania.

Terms: $50.0 million equivalent World Bank loan. Term of 15 years with interest at 8.2 percent per annum. Total project cost: $128.9 million equivalent.

Purpose & Benefits: This new facility provides for the expansion of polyester production capacity needed to satisfy the growth in domestic consumption through 1983. Exportable surpluses (averaging 7,200 tons annually) during the intitial period of operation from 1980–83 are also expected to be generated. In addition to significant transfers of technology in the chemical and machine-building industries, the project will develop industry and employment opportunities in a relatively less developed region of Romania. Estimated net annual foreign exchange savings or earnings from the project are about $30 million equivalent. The estimated economic return on the project is 15.6 percent. The Romanian planning system provides that project output will meet future needs and no marketing problem is anticipated for the small amounts of exportable surplus during the initial years of plant operation.

Date Approved: June 7, 1977 (IBRD)

RWANDA

AGRICULTURE: The project to be financed with this IDA credit will assist smallholders in improving and developing cinchona production. Specifically, it will help provide farm inputs, extension and marketing services to facilitate smallholder cinchona production, additional staff and staff training, and consultants' services in project execution and advice on agricultural development in general.

Borrower: Republic of Rwanda.

Terms: $1.8 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $2.0 million or equivalent.

Purpose & Benefits: Some 3,600 farm families will benefit from this project designed to encourage the culture of cinchona as a cash crop. During the five productive years of the ten-year cinchona tree cultivation cycle, a farmer should be able to increase his annual income by 25 percent. Additional benefits stem from the use of debarked trees as firewood, which is in short supply in Rwanda. At full development in 1987, the incremental production of cinchona under this project is expected to be 450 tons, bringing Rwanda's total production of cinchona to about 1,000 tons per year and raising its share of the world market from about 4 percent at the present time to about 10 percent. Although the world market for natural quinine is small and dominated by firms with major plantations in Zaire and Indonesia, demand for cinchona is expected to rise progressively. On the basis of current estimates, Rwanda should have no difficulty in selling its total production on world markets. The Government of Rwanda is also planning to process cinchona locally and for this purpose is negotiating with investors to establish a processing plant. This project will have a favorable impact on Rwanda's balance of payments—over the first ten years of operation it should yield a net foreign exchange inflow of about $4.0 million equivalent. The economic rate of return on the project is estimated at about 15 percent.

Date Approved: July 13, 1976 (IDA)

DEVELOPMENT FINANCE COMPANY: This credit will assist in financing the Rwanda Development Bank's (BRD) foreign exchange needs for development finance operations through mid-1978. Audits of the BRD's accounts will also be included in this project. The Government of Rwanda is to on-lend the proceeds of the credit to the BRD for a period substantially in conformity with the aggregate of the amortization schedules of the sub-loans, but not exceeding 20 years in the case of tourism projects, and 15 years in the case of other loans and investments, with interest on these sub-loans at 4 percent per annum. The BRD, for its part, will re-lend the resources at an effective cost to sub-borrowers of not less than 7 percent to small-scale enterprises, and not less than 9 percent to medium- and large-scale enterprises. Amortization of the BRD sub-loans is to be over a period of up to 20 years, depending on the nature of the project being financed. Foreign exchange risks are to be borne by the Government of Rwanda.

Borrower: Republic of Rwanda.

Terms: $4.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum.

Purpose & Benefits: The economic rates of return on the BRD's sub-projects are expected to be somewhat higher than the corresponding financial rates of return (which will average about 10 percent), reflecting the economic benefits of employment creation and increased foreign exchange earnings. Other contributions of this project to the Rwandese economy are difficult to quantify. The BRD is the only institution for the promotion and financing of industrial investment in Rwanda, and these IDA resources will constitute a significant proportion of the foreign exchange needed for such investment. The credit will thus make a major contribution to the implementation of the Government's policy of expanding and diversifying the economy. In addition, IDA will help the BRD strengthen its project appraisal capabilities and internal accounting methods, and support technical assistance to borrower enterprises.

Date Approved: July 13, 1976 (IDA)

RURAL DEVELOPMENT: This project, which IDA will co-finance with the Banque Arabe pour le Developpement Economique en Afrique (BADEA) and the Kingdom of Belgium, will promote mixed crop and livestock farming, and rural development in Rwanda. Specifically, the resources will be used to provide spraying equipment and insecticides for the tsetse fly eradication program, field extension services and infrastructure, credit for agricultural inputs and livestock, construction and upgrading of access and feeder roads, potable water distribution systems, improved social facilities including schools and health centers, ranch development and improved livestock marketing, and technical assistance.

Borrower: Republic of Rwanda.

RWANDA—Continued

Terms: $14.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $23.3 million equivalent.

Purpose & Benefits: Evidence demonstrates that relatively small investments and simple modifications in existing farm systems in the project area yield high financial returns. The economic rate of return from the directly productive elements of this project has been estimated at about 32 percent. There are substantial risks in the project, however, since successful development will depend on the effectiveness of efforts to persuade farmers to adopt new techniques on a wide scale. Improved organization of extension services, better coordination among government agencies, and introduction of new institutions and programs will be difficult and complex, but are essential to the success of the project. An additional risk is the possibility that institutional innovations will lapse following the project investment period because of inadequate arrangements for continuing services and maintaining infrastructure. The project seeks to overcome these risks through institution-building and training. In any event, real possibilities exist for improving services and raising production levels substantially. As one means of minimizing these problems, the project will be closely supervised during its implementation phase.

Date Approved: December 14, 1976 (IDA)

SENEGAL

TOURISM: This World Bank loan will cover approximately two-thirds of Societe Financiere Senegalaise pour le Developpement de l'Industrie et du Tourisme (SOFISEDIT) requirements for financing the foreign exchange components of various industrial and tourism projects through the year 1978. Some of the loan proceeds will also be passed on to the Societe Nationale d'Etudes et de Promotion Industrielle (SONEPI) to help that institution develop an integrated program for assisting small-scale Senegalese entrepreneurs.

Borrower: Republic of Senegal.

Terms: $4.2 million equivalent. This loan will be repayable substantially in conformity with the aggregate of the amortization schedules for sub-loans with interest at 8.90 percent per annum.

Purpose & Benefits: Five projects have so far been approved, for a total amount of $1.8 million under a previous World Bank loan to this agency. These included operations in the manufacture of chemical plaster, the expansion of a brewery and soft drink factory, enlargement of a textile company using locally produced cotton, and a new 50 double-room hotel. All of these projects show satisfactory financial and economic rates of return. For 1976 and 1977, SOFISEDIT had a pipeline of 20 pending projects with total investment needs of $27 million. Potential SOFISEDIT investment in these projects amounted to $6.7 million in medium- and long-term loans, and $0.4 million in equity investments (dollar equivalents). Fifteen of these projects are to be Senegalese-majority owned and four are in the small- and medium-scale category requiring individual total investments of less than $0.4 million equivalent. SOFISEDIT financial assistance to small-scale entrepreneurs is being provided in cooperation with SONEPI and a program outlining strategy and promotional activities to stimulate development of the small-scale sector has been submitted to the World Bank. Over the period 1977 to 1980, there are about 35 projects in the pipeline with a total estimated investment of $65 million. Of this, SOFISEDIT financing is forecast at about $13.3 million in loans and $0.9 million in equity investments (equivalents). SOFISEDIT operations are expected to increase substantially in coming years, primarily because its fixed 12 percent interest rate for long-term finance is expected to be competitive with other institutions (which usually offer floating, Eurodollar-based, rates) and its superior project appraisal capability should enhance prospects that its projects will receive medium-term rediscount facilities from the Central Bank.

Date Approved: September 21, 1976 (IBRD)

TRANSPORTATION: The major objectives of this port development project are: (a) to increase available berth space at Dakar so that all of the vessels in the industrial fishing industry can be accommodated in a single area of the port with additional space sufficient to accommodate fleet expansion through the 1980's; (b) to provide essential waterfront land area to repair trawls and nets, store and maintain fishing gear, and build ice plants, workshops, and administrative offices to manage the fishing fleet; (c) to derive maximum revenues from landings and exports of fish and fish products; and (d) to study facility requirements for handling future container traffic at Dakar.

Borrower: Republic of Senegal.

Terms: $6.0 million equivalent World Bank Third Window loan. Term of 24 years with interest at 4.2 percent per annum. Total project cost: $24.0 million equivalent.

Purpose & Benefits: This project is designed to eliminate existing congestion at the Dakar fishing fleet facilities. Completion of the project will help the Government of Senegal meet its objectives of developing the industrial fishing sector and expanding local processing activities to increase exports. Landings by the Dakar-based industrial fleet rose from about 16,000 tons in 1964 to almost 80,000 tons in 1974/75 (an average rate of 18 percent annually) and forecasts suggest that volume could reach 125,000 tons in 1979, 200,000 tons in 1983, and possibly a maximum of about 260,000 tons by the end of the 1980's. Landings by foreign fleets are also expected to increase during the same period from the present level of about 30,000 tons to about 80,000 tons. Direct benefits of the project will include savings in loading and unloading costs, fish deterioration losses, and time spent in servicing fishing vessels and handling freezer cargo ships, the avoidance of congestion at commercial cargo berths and improvement in the productivity of existing fish plants which have been operating at half capacity. The benefits accruing from this investment yield an overall economic rate of return of about 23 percent.

Date Approved: April 19, 1977 (IBRD)

TOURISM: The principal objectives of this project are: (a) to provide infrastructure facilities for the development of a beach-based 2,500 bed resort on the Petite Cote, a major tourist area; (b) to contribute to the Government's ongoing program to preserve Goree Island and develop it as a tourist site by upgrading the streets, improving the harbor, and extending and renovating the local Government-owned hotel; and (c) to improve the planning, promotional, and training capacities of the Delegation Generale au Tourisme (DGT).

Borrower: Republic of Senegal.

Terms: $5.6 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. $8.0 million equivalent World Bank Third Window loan. Term of 24 years with interest at 4.2 percent per annum. Total project cost: $17.3 million equivalent.

Purpose & Benefits: This project is part of an investment program which includes infrastructure, common facilities, a pilot hotel, irrigation, and renovation on Goree Island, plus related superstructure facilities such as hotels and shops which are expected to be developed by private sector entrepreneurs. Total cost of the investment program is estimated at $48.2 million equivalent (1976 prices). The benefits to the Senegalese economy from the project will be in the form of tourist expenditures. The project is expected to attract new beach-motivated traffic without diverting customers from existing hotels. Consequently, the gross benefits from tourism will be incremental to Senegal. Benefits expected to be generated by the investments on Goree have been taken into account only to the extent that they appear in anticipated expenditures of visitors. The major justification for the investment on Goree Island is the preservation of an area of cultural and historical importance which will play a significant role in enhancing Senegal's attractiveness as a tourist destination. Benefits will also accrue from the irrigation component and the provision of utilities to neighboring villages. On the basis of an estimated 30-year life for the project, the economic rate of return is expected to be almost 16 percent.

Date Approved: April 26, 1977 (IBRD)

SOMALIA

INTERMEDIATE CREDIT INSTITUTION: These IDA credit resources will help meet part of Somali Development Bank (SDB) foreign exchange requirements through June 30, 1979, and aid in strengthening the SDB through technical assistance.

Borrower: Somali Democratic Republic.

Terms: $5.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum.

Purpose & Benefits: This project aims at strengthening a financial institution which plays a key role in Somalia's development, particularly in the industrial sector. While the SDB role has expanded, its technical expertise has tended to lag. As a result of the assistance to be provided under this credit, SDB will improve its appraisal and follow-up techniques, thereby also improving the quality of its portfolio. Projections indicate that SDB will continue to be a sound financial institution—its assets are forecast to increase from So.Sh. 161 million in 1976 to So.Sh. 373 million in 1981, or an annual growth rate of 18 percent. The increase in assets will be financed primarily by equity (So.Sh. 87 million), borrowed funds (So.Sh. 100 million), and internally generated funds (So.Sh. 25 million). SDB's long-term debt/equity ratio is expected to remain low through 1981, reflecting substantial additional borrowing capacity. SDB's debt service coverage for interest and principal payments is projected to increase from 2:5 in 1976 to 5:5 in 1981, providing ample cushion for unforeseen shortfalls in loan collections.

Date Approved: April 19, 1977 (IDA)

TRANSPORTATION: This IDA credit will help finance a roads development project comprising the construction of the Hargeisa-Borama Road with a link to Tug Wajale in Northern Somalia, the execution of feasibility and detailed engineering studies of the Dinsor-Bardera-Gelib Road in Southern Somalia, and the strengthening of the Civil Engineering Department in the Ministry of Public Works through technical assistance, training and machine shop equipment.

Borrower: Somali Democratic Republic.

Terms: $7.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $30.0 million equivalent.

Purpose & Benefits: These project roads will constitute important elements in the national road system by extending paved road westward from Hargeisa, Somalia's second largest city, to Borama and Tug Wajale, thus opening up an area which produces considerable livestock and agricultural crops. In addition to serving growing transportation demand in the northwest region, the roads will facilitate trade with Ethiopia. Main project benefits will be increased revenues from livestock exports due to the anticipated shift from livestock trekking to truck transport (with consequent reduced loss in animal weight). Potential weight savings are a powerful incentive, as evidenced by the virtually complete shift to the trucking of livestock on the Hargeisa-Berbera Road during the first year that road was open. Another benefit of the project is savings in vehicle operating costs for normal traffic. The principal beneficiaries will be road users, but benefits will ultimately be widely distributed among producers, traders and consumers because of the Government's transportation rate policy. The economic rate of return on the road construction component (about 90 percent of project costs) is 21 percent.

Date Approved: April 19, 1977 (IDA)

SPAIN

INDUSTRY: The project will establish a Research, Development and Engineering (RD&E) Unit to carry out selected sub-projects in industrial research, development and engineering as part of a Spanish Government program to promote industrial capabilities and support the competitive position of Spanish industry through development of indigenous technology and marketing expertise.

Borrower: Spain (Ministry of Industry).

Terms: $18.0 million equivalent World Bank loan. Term of 13 years with interest at 8.2 percent per annum. Total project cost: $40.3 million equivalent.

Purpose & Benefits: This is an innovative and unique project for World Bank lending. While it will not be appropriate for direct replication in many countries it is regarded as particularly suitable for Spain, which already has a developed industrial capacity and a large pool of skilled workers and it is expected to yield substantial (non-quantifiable) benefits. The program will initiate a systematic effort to develop new products and processes for commercial exploitation. A new institutional organization and new procedures for controlling and directing research are to be created and, by encouraging private sector participation, will promote the undertaking of RD&E as a means of developing and maintaining Spain's competitive position in foreign and domestic markets. The level and complexity of Spain's industrial structure is such that a project aimed at improving its capabilities to undertake indigenous technological development appears timely and has good chances of success. The project, being the first of its kind for the World Bank, will provide experience for a number of developing countries interested in developing indigenous RD&E capabilities.

Date Approved: May 17, 1977 (IBRD)

SRI LANKA

IRRIGATION: This credit will help fund the modernization of five existing tank irrigation and drainage schemes in Sri Lanka's north-central dry zone. The project is aimed at increasing agricultural production in the water reservoir areas.

Borrower: Sri Lanka.

Terms: $5.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $30.0 million equivalent.

Purpose & Benefits: The dry zone of Sri Lanka has about 180 major tank irrigation schemes serving a total cultivated area of about 400,000 acres. Deterioration of water conveyance systems, poor water management and inadequate agricultural supporting services have been the prime constraints to increasing agricultural production in this area. This project is to be a prototype for upgrading existing irrigation facilities to their full potential and successful project implementation will open the way for the eventual modernization of all of Sri Lanka's tank schemes and could potentially add one-quarter of a million tons to foodgrain production. More directly, the project-related production increase at full development is expected to be about 22,300 tons of foodgrains (rice, 16,600 tons; cereals, 3,400 tons; and pulses, 2,300 tons) which will represent annual gross foreign exchange savings of $5.4 million equivalent. Allowing for added imports of fuel, fertilizers, agro-chemicals and farm equipment, the annual net foreign exchange saving will be about $4.0 million equivalent. The project will directly benefit 10,000 small farm families operating mostly small land holdings of less than 2 ha. each. Present farm incomes in the project area are substantially below the national average. At full project development, farmers are expected to at least double their present incomes. The project's economic rate of return is estimated at about 23 percent.

Date Approved: November 30, 1976 (IDA)

RURAL DEVELOPMENT: This IDA credit will help finance a project constituting the first major development of new lands in Sri Lanka's north-central dry zone covered by the Government's Mahaweli Master Plan. The project will utilize experience gained from ongoing irrigation/settlement works in this area and elsewhere in Sri Lanka. Irrigation works and land development, agricultural production support, and social infrastructure required for completing Stage II of the Government's plan will also be furnished under the project.

Borrower: Republic of Sri Lanka.

Terms: $19.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $100.5 million equivalent.

Purpose & Benefits: Land and water resources in the sparsely settled dry zone of Sri Lanka are highly underutilized. Because of low rainfall, irrigation has traditionally been essential for intensified cultivation. This project will help relieve this major water resource constraint and help the Government to achieve three of its basic development objectives, *viz.*, increase food production, reduce unemployment and underemployment, and improve income distribution. The production increases expected as a result of the project are estimated at 42,300 tons of foodgrains, 1,100 tons of chillies, and 3,300 tons of oil crops. Increased foodgrain production is expected to lead to net foreign exchange savings of $8.0 million equivalent annually. Increased labor requirements will be due primarily to the expansion of cultivated area and the more intensive use of land with about 12,000 new full-time jobs in agriculture to be created by this project. With an increase in the gross value of agricultural production of some Rs.150 M at full development, the project is expected to generate additional income and employment in local non-farm sectors such as marketing, transportation and processing as well. The project economic rate of return is estimated at about 21 percent.

Date Approved: April 21, 1977 (IDA)

WATER SUPPLY: This IDA credit will help finance improvements in the water supply system serving Colombo Municipality and Towns South. It also provides for extending the system to Towns North (an area which currently has no piped water). New water supply systems will be provided for some of the more remote towns as well (Kalutara and Ambalangodo) which do not have piped water supplies.

Borrower: Republic of Sri Lanka.

Terms: $9.2 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $42.5 million equivalent.

Purpose & Benefits: Hardships imposed by water shortages in the Colombo area affect the poorer segment of the Community more than middle- or higher-income groups which are better placed to provide their own means of supply and which are not forced to rely entirely on the public water system. Industrial, commercial and tourist establishments will also benefit from this project. In Colombo and adjacent towns, water shortages have prompted the Government to proceed with improvements of headworks at Ambatale, despite the inadequacies of the system for conveying this water to the consumers. These essential links are to be strengthened under this project and interdependent components of facilities presently under construction are to be completed, thereby realizing the full benefits of previous investments in water sources. In addition, the improved Ambatale works, together with associated transmission and distribution improvements, will bring water to 250,000 new consumers in Towns North and provide 24-hour daily service to 1.2 million consumers in Colombo and Towns South by 1981. The new systems proposed for the Kalutara and Ambalangodo areas will provide adequate and safe water to 160,000 new consumers by 1981. Continued use of existing shallow well sources and their proximity to inadequate sanitation facilities constitutes a danger to public health and impedes the potential growth of tourism in this area. In addition to providing a safe and continuous supply of water to all sections of the community, the project will extend consumer metering and introduce financially adequate tariffs which discourage waste and excessive consumption yet provide enough water to meet the essential daily requirements of the poor at an affordable cost.

Date Approved: May 10, 1977 (IDA)

SUDAN

RURAL DEVELOPMENT: This IDA credit will help finance a project designed to reverse the trend of ecological degradation in Western Sudan. A settlement program with the dual purpose of opening presently blocked stock routes and of increasing crop production is to be implemented. The opening of stock routes is vital for the annual migration of the transhumant families and their livestock, and the rationalization of local land use to facilitate this migration will be one of the principal goals of the settlement concept. The project will also aim to build up a development-oriented local administration through the establishment of a Development Corporation—staff for the Development Corporation will be provided to execute the settlement and crop production program, including extension services, adaptive research and a pilot crop marketing scheme, range management and a livestock development program.

Borrower: The Democratic Republic of the Sudan.

Terms: $17.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $38.2 million equivalent.

Purpose & Benefits: This project is the first phase of a long-term program to enhance the use and potential of the savannah region and lay the basis for subsequent phases, when incremental crop production will become economically significant. During this project, only a modest added start-up production is expected to be achieved and only modest success in modernizing livestock production is anticipated. The main quantifiable benefits of the project as a whole (including a second phase) will be substantial increases in marketed crops and livestock production, valued at $22 million equivalent annually by year 17 reflected in substantially increased cash incomes for the families involved (about 200,000 people). The overall economic rate of return for the program over 30 years is estimated at 14.5 percent. The rate of return on the settlement and crop production component is 9 percent and, on the livestock development, 22.5 percent.

Date Approved: May 31, 1977 (IDA)

TRANSPORTATION: This project covers part of the Sudan Railway Corporation (SRC) investment requirements during the first three years (1977 to 1980) of the Government's Six-Year Development Plan. It includes the establishment of new diesel locomotive and rolling stock workshops, sleeper renewal on 500 km. of track, rail renewal on 344 km., completion of the rail communications network, the purchase of ten replacement diesel locomotives and 400 freight cars, purchase of locomotive spare parts, completion of the Atbara railway training school, and technical assistance in workshop design and organization.

Borrower: The Democratic Republic of Sudan.

Terms: $12.0 million equivalent World Bank Third Window loan. Term of 25 years with interest at 4.2 percent per annum. $8.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $141.6 million equivalent.

Purpose & Benefits: The need for investments in Sudan Railways is very great and is related to the long distances which need to be travelled, the nature of the goods being transported and the cost of providing alternative forms of transportation. The distance from Port Sudan to Sennar, for example, is over 1,000 km. and the distances between many of the new agricultural developments to Port Sudan are equal to, or exceed, the distance from St. Louis to New Orleans, or from New Delhi to Bombay, for examples. Goods carried by Sudan Railways are, and for the foreseeable future will be, dominated by low-value bulk commodities, the most important being cotton, groundnuts, sesame, oil cake and other agricultural products for export. Imports of black oils, fertilizer, iron and steel, sugar and bulk foods; and in domestic traffic, cement, timber and foodstuffs also rely heavily on rail carriage. The most rapidly rising traffic is expected to consist of groundnuts, oil cake, grain, sugar, fertilizers, iron and steel, cement, black oils and livestock. Given the Sudanese distances, the cost advantage in favor of rail transportation for these goods is striking and far outweighs the benefits of convenience and speed associated with transportation by road. SRC also expects to expand its role in passenger traffic, especially for those who cannot afford air travel. The principal quantifiable benefits of this project are reduced turn-around time and reduced equipment requirements from track upgrading; reduced costs and equipment requirements from improved maintenance systems; and reduced costs of transportation, vis-a-vis trucking, from the additional locomotives and rolling stock. On the basis of these quantifiable benefits, the economic return on the project is calculated to be 27 percent.

Date Approved: June 28, 1977 (IBRD and IDA)

SWAZILAND

RURAL DEVELOPMENT: This World Bank loan will help provide assistance to ten Rural Development Areas and includes strengthening and developing extension services and infrastructure, livestock development, land development and construction works, incremental agricultural inputs, credit services, access and feeder roads, social infrastructure development, central management services and studies and training.

Borrower: Kingdom of Swaziland.

Terms: $4.0 million equivalent. Term of 20 years with interest at 8.5 percent per annum. Total project cost: $17.1 million equivalent.

Purpose & Benefits: The benefits of this project will consist of: (a) increased production and marketing of crops (valued at $7.2 million equivalent annually at full development) and livestock (valued at $0.9 million equivalent annually at full development); (b) the provision of rural infrastructure and services (roads, water supply, health centers, nutrition information and family planning); (c) the strengthening of rural development project management capabilities; and (d) pro-

WORLD BANK—Continued

SWAZILAND—Continued

tection of arable and grazing areas from soil erosion. Most of the additional production is to be exported (foreign exchange earnings) although some will be retained for domestic consumption (lower import requirements). An estimated 125,000 people in the lowest income brackets in Swaziland (current family cash incomes range from $115 to $280 equivalent annually) will benefit from the project in the forms of increased consumption, higher cash incomes, and improved social services. Project investments will also increase annual agricultural labor requirements in rural development areas by the equivalent of about 2,500 man-years. Most civil works are to be labor-intensive and will employ an estimated 500 additional persons during construction. The economic rate of return of the directly productive elements of the project (about 80 percent of net project investment) is estimated at from 20 to 25 percent.

Date Approved: March 8, 1977 (IBRD)

INDUSTRIAL & TOURISM DEVELOPMENT: This World Bank loan will help finance a program to develop Swaziland industry and tourism by providing financial and technical assistance to the National Industrial Development Corporation of Swaziland (NI DCS) and the Small Enterprises Development Company (SEDCO), institutions founded in the early 1970's to promote industrial development via long-term loans and equity investments in medium-sized enterprises and financial and technical assistance to small-scale enterprises. These institutions share common facilities where feasible (finance, accounting, legal and appraisal) although each retains a separate identity. The World Bank loan will assist in meeting foreign exchange requirements of both institutions through March 1979.

Borrower: National Industrial Development Corporation of Swaziland (NIDCS). *Guarantor:* Swaziland.

Terms: $5.0 million equivalent World Bank loan. Repayable in accordance with a schedule which would conform substantially to the aggregate of the amortization schedules of sub-loans with interest at 8.2 percent per annum.

Purpose & Benefits: The Government of Swaziland adopted a policy soon after Independence of promoting medium-size and small-scale enterprises to bridge the gap between the rural sector and the few large expatriate-managed agro-industries and mining ventures. The goal was to attract foreign investment to help diversify the economy and develop Swazi entrepreneurial talent and business skills with the long run objective of providing local management for all Swazi industrial enterprises. NIDCS and SEDCO were established in support of these policies. Early institutional problems gradually are being overcome and significant improvements have been made in both institutions. Both have investment programs which, if well implemented and supervised, will contribute substantially to the development of Swazi enterprise. An important project benefit will be the World Bank's continued assistance to NIDCS and SEDCO. During project preparation, the Bank provided policy and procedural advice to both institutions and each now has formulated a basic policy statement with respect to future operations and each has developed operational and financial manuals for the evaluation and supervision of projects. Continued improvement in NIDCS and SEDCO policies and operations, particularly in the areas of management, resource allocation and financial discipline, is expected to lead to a reduction of dependence on Government financing and eventually enable these two institutions to generate their own investment resources.

Date Approved: April 21, 1977 (IBRD)

SYRIAN ARAB REPUBLIC

AGRICULTURE: This project will lead to an increase and the stabilization of livestock production and the incomes of Bedouin flock owners and sheep fatteners in Syria. This should also strengthen Syria's national feed policy, improve feed availability and reinforce animal health services. The project consists of strengthening such organizations as the National Feed Policy Committee, the General Organization for Feed, and the Agricultural Cooperative Bank, providing finance for the annual purchased feed needs of sheep cooperatives, and reinforcing the animal health services of the Ministry of Agriculture and Agrarian Reform by providing vehicles, facilities, equipment, pharmaceuticals and technical assistance.

Borrower: Syrian Arab Republic.

Terms: World Bank loan: $5.0 million equivalent. Third Window loan: $12.5 million equivalent. Term of 20 years with interest at 8.85 percent per annum and 25 years with interest at 4.85 percent per annum, respectively. Total project cost: $34.5 million equivalent.

Purpose & Benefits: This project is designed to avoid major sheep losses which have occurred in the past and stimulate a major increase in production from Syria's national sheep flock. By offering financing for feed, the project will provide incentives for fattening twice the number of animals now being prepared for market. The project will also strengthen recent trends for providing supplementary winter feed to range animals and increase the availability of grazing resources to range sheep. Strengthening Syria's animal health services is expected to consolidate gains in sheep flock stabilization through the reduction of losses in livestock from preventable infectious diseases and parasites. At the national level, the project should increase meat, milk and wool production by 67, 33 and 10 percent, respectively. The economic rate of return for the project and the related Emergency Feed Reserve is estimated at about 21 percent. The beneficiaries of the project—sheep flockowners and fatteners—are among the poorer segments of Syria's population with a per capita income of about half the national average. The principal beneficiaries of the project will be the Bedouin and semi-nomadic flockowners and members of sheep and range cooperatives.

Date Approved: July 6, 1976 (IBRD)

SANITATION AND WATER: The components of this project comprise: (a) an expansion of the intake, transmission and treatment facilities from Lake Assad to Aleppo and extension of the distribution system; auxiliary buildings, office facilities, equipment and staff training for the Aleppo Water Supply Authority (EPEA); and related consulting services; (b) feasibility and preliminary engineering studies of sewage collection, treatment and disposal systems for Aleppo and Lattakia; and (c) technical assistance to the State

Planning Commission and public construction enterprises for the collection and analysis of data on construction resources and building materials and improving the administration of enterprises.

Borrower: Syrian Arab Republic.

Terms: $50.0 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $116.8 million equivalent.

Purpose & Benefits: The high incidence of waterborne diseases in the Aleppo area stems in part from the following causes: (a) because of severe water shortages during the past three summers, large sections of the supply area have been turned off in rotation resulting in the back-syphoning of polluted groundwater into the distribution system; (b) outlying urban areas cannot be provided with piped supplies until increased source facilities are available; and (c) during periods of water shortage the supply is supplemented by untreated water from private wells, the quality of which is not continuously monitored. With the completion of the second phase of the supply works in 1977, these health hazards should be eliminated. The major benefits associated with providing a reliable and safe water supply are health-related and will be partially reflected in medical cost savings, a general improvement in individual well-being and a cost saving to and/or increased productivity of business enterprises. Because of their nature and the absence of specific data, such benefits cannot be quantified. Using the value of sales of incremental water supply from the project (at current levels of tariffs and charges) as a minimal measure of economic benefits, this project will have an internal economic rate of return of at least 10 percent.

Date Approved: June 14, 1977 (IBRD)

TANZANIA

AGRICULTURE: The project this World Bank loan will help finance provides a five-year program for planting and maintaining about 16,000 ha. of forests, maintaining about 11,000 ha. of existing plantations, and developing infrastructure and forestry services in the project area. Specifically, the project components include afforestation and surveys of a total of 15,750 ha. of pulpwood plantations, establishing nurseries, preparing ground, weeding, and instituting silvicultural treatment and disease control programs. In addition, about 330 ha. in the designated sawlog area will be replanted, 8,800 ha. of existing pulpwood plantations and about 2,500 ha. of sawlog plantations are to be maintained, 164 km. of primary and secondary roads and 393 km. of tracks will be built, and staff housing and administrative facilities will be organized.

Borrower: United Republic of Tanzania.

Terms: $7.0 million equivalent World Bank loan. Term of 25 years with interest at 8.85 percent per annum. Total project cost: $8.1 million equivalent.

Purpose & Benefits: The plantations to be established and maintained under this project are expected to be the principal source of raw materials for a proposed pulp and paper mill. Some of the Sao Hill reserves will also be set aside for a sawlog area to provide inputs for a proposed new sawmill. This project is an integral element of Tanzania's long-term plantation program at Sao Hill which involves creating 65,000 ha. of plantations by the early 1990's. The economic justification for the project relates to the overall afforestation program and its associated industrial development. The major quantifiable project benefits arise from production of paper and paperboard. At full project development, the annual value of increased production of these commodities is expected to reach $123 million equivalent. A sawlog area of 5,000 ha. should eventually support two work shifts for the mill which is now being built. The long-term economic rate of return for the pulp and paper component of the project is estimated at 13.5 percent. The rate of return for sawlog production is estimated at about 21 percent. Project benefits will be distributed among those employed directly in the plantation program (most of whom are in the lower rural income brackets) and those employed in related processing industries. The project is expected to create direct additional employment of about 500 man-years. Other, unquantifiable, benefits will stem from the training and research programs and the rural road system.

Date Approved: July 1, 1976 (IBRD)

FISHERIES: This IDA credit will help fund the first stage of a long-term program to develop fisheries production in Tanzania. The resources will support the establishment and development of commercial fisheries at three marine centers and one inland center on Lake Tanganyika. Components of the project include the development of a pilot village fisheries program, the provision of fish transport facilities on Lake Tanganyika, marketing and pollution studies, future project preparation and related technical services.

Borrower: United Republic of Tanzania.

Terms: $9.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $12.3 million equivalent.

Purpose & Benefits: At full development this project is expected to result in about 21,000 tons of annual incremental marketed production of fish, including about 400 tons of shrimp, 1,800 tons of table fish, 13,500 tons of dagaa, and substantial quantities of other species. The total annual value of this production is estimated at $5.0 million equivalent. Because of this expanded production, fish consumption will rise in many areas where diets are presently protein-deficient. This is especially true in the case of dried dagaa, which has the lowest cost per unit of protein of all food consumed in Tanzania. Another important benefit of the project will be the development and demonstration of more sophisticated, but still relatively simple, fishing techniques at the village level. This should enable local fishermen better to exploit an existing but greatly under-utilized resource. Providing lake transportation facilities will open up the more remote areas of the lake shore to exploitation and trade. It is expected these developments will help raise incomes in the affected fishing communities and provide the basis for long-term development of Tanzania's fishing sector. The economic rate of return for the project is estimated at about 27 percent.

Date Approved: July 1, 1976 (IDA)

POWER: This World Bank loan will assist in financing a concrete dam to create a reservoir for the yearly regulation of river water at Mtera, extension of the Kidatu hydro-electric generating station by two 50 MW. units, installation of a 90 MVA. transformer at Morogoro, consulting services and training for Tanzania

Electric Supply Co., Ltd. (TANESCO) management and professional staff.

Borrower: Republic of Tanzania.

Terms: $30.0 million equivalent World Bank Third Window loan. Term of 25 years with interest at 4.85 percent per annum. Total project cost: $91.0 million equivalent.

Purpose & Benefits: This project is designed to supply additional power to TANESCO's interconnected system. The average rate of growth of electricity sales by this system since 1966 has been 10.5 percent per annum and industrial sales are growing by about 14 percent annually. Commercial sales are rising 9 percent and domestic service sales 8 percent per annum. Taking into account a 40 percent tariff increase and related power marketing developments, the World Bank load forecast indicates that kwh. sales from the interconnected system will increase from the abnormally low level of 5.6 percent in 1974 to 7.7 percent in 1975 and 8.3 percent in 1976, and should reach an average growth rate of about 10 percent per annum between 1977 and 1985. This projected maximum demand, together with installed and firm capacity, indicates that the present system can meet requirements until 1980. This project is thus designed and phased to provide capacity required to meet rising power demand after 1980. The economic rate of return on the project is calculated at about 23 percent.

Date Approved: July 1, 1976 (IBRD)

AGRICULTURE: This IDA credit will help finance an increase in the production capacity of the Tanzania Tobacco Processing Company facility at Morogoro from about 19 million kg. of cured leaf per annum in 1976 to some 41 million kg. by 1980. The expansion program will be carried out in two phases, the first comprising additions to, and improvements of, the plant's existing leaf processing line. The second phase is to involve the purchase of equipment, machinery and quality control devices needed for the installation of a new processing line to accommodate rising leaf production anticipated during the next several years. The project will entail technical assistance and training, improved storage facilities at Morogoro and new office and export storage space at Dar-es-Salaam. Construction of roads, water supply facilities, offices, railroad sidings and other basic infrastructure at Morogoro is also to be provided under this project.

Borrower: Republic of Tanzania.

Terms: $8.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $11.3 million equivalent.

Purpose & Benefits: This project will double the tobacco processing capacity of this company and provide the capacity needed to process anticipated increased tobacco production. Most of the additional tobacco processed will be destined for export. The gross foreign exchange value of the tobacco crop is expected to be about $57 million by 1985, compared with about $27 million (equivalents) in 1976. The economic rate of return for the project is estimated at 25 percent over a twenty-five year period. The project is sensitive to changes in tobacco production and export prices. A 10 percent reduction in either factor could reduce the economic rate of return to 19 percent; and if both factors declined 10 percent simultaneously, the rate of return on the project could be reduced to 11 percent. A combined increase of both tobacco production and export prices would, on the other hand, increase the rate of return to nearly 42 percent. These risks have been taken into account in designing the processing facilities to be provided under this project. The Tanzania Tobacco Processing Company has had a good record in managing the Morogoro plant and the technical assistance to be provided should permit operation of the new equipment at reasonably efficient levels.

Date Approved: September 7, 1976 (IDA)

WATER SUPPLY: This project encompasses construction of an earth dam across the Ngerengere River near Morogoro with related tower intake, culvert and spillway; providing water transmission pipelines, treatment and pumping stations, storage reservoirs and a reticulation extension in Morogoro to increase existing peak water production and transmission capacities by about 25,400 m^3/day; the supply of new vehicles for the urban water unit in Morogoro; and management advisory services and a training program for the Tanzanian water sector.

Borrower: United Republic of Tanzania.

Terms: $15.0 million equivalent World Bank loan. Term of 20 years with interest at 8.7 percent per annum. Total project cost: $19.2 million equivalent.

Purpose & Benefits: The water supply for Morogoro is inadequate with water demand far exceeding safe output from the river source. Severe water shortages and low pressure problems occur during the dry season. Given projected population and industrial growth in Morogoro, the water production deficit could increase rapidly, presenting major health problems and a sharp constraint on industrial development. This project is designed to address this problem and provide facilities to meet the water needs of Morogoro up to 1986. The project will eliminate the water deficits faced by Morogoro's present population (39,000) and provide adequate water supplies for an additional 27,000 inhabitants. The amount of water available for industrial and commercial use will also increase substantially—this is particularly important since Morogoro's central location is a fundamental element in the Government's decision to locate the first major Tanzanian industrial estate at Morogoro. The productive aspects of this project are reflected in the fact that by 1986 it is estimated that industrial and commercial uses will constitute about 59 percent of total water consumption in Morogoro. The rate of return on this investment is estimated at 7.9 percent but this does not measure all of the benefits of the project—the substantial social and health benefits cannot be quantified.

Date Approved: December 23, 1976 (IBRD)

PROGRAM CREDIT: This IDA credit will provide foreign exchange to finance imports of essential capital, intermediate goods and raw materials for use in both the public and private sectors and to generate counterpart funds to cover certain portions of Tanzanian Government development budgets which would not otherwise be financed.

Borrower: United Republic of Tanzania.

Terms: $15.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum.

Purpose & Benefits: The rationale for this program credit emerges from an analysis of the short- and longer-term development problems facing Tanzania and a review of the policies and programs being applied to deal with these problems. Prevailing circumstances indicate that this credit conforms fully with IDA's program lending criteria. It is also complementary to on-going World Bank project assistance to Tanzania. The Government of Tanzania has adopted policies and programs to deal with the problem of increasing production and these, in turn, have provided the basis for the development of World Bank involvement in project identification, preparation and implementation in recent years.

Date Approved: March 15, 1977 (IDA)

INDUSTRY: These World Bank loans will support the establishment of an Industrial Complex at Morogoro. Specific components of the project include: (a) the first phase (65 ha.) of an industrial estate including infrastructure and facilities for small and medium scale industries; (b) a shoe factory with capacity to produce 2 million pairs of leather shoes and 2 million pairs of canvas shoes annually; and (c) a leather goods factory to fabricate handbags, suitcases, jackets and similar items.

Borrower: United Republic of Tanzania.

Terms: $11.5 million equivalent World Bank loan. Term of 20 years with interest at 8.5 percent per annum. $11.5 million World Bank Third Window loan. Term of 24 years with interest at 4.5 percent per annum. Total project cost: $36.2 million equivalent.

Purpose & Benefits: The overall financial return for the Morogoro Complex is forecast at 15.2 percent (after taxes, constant 1975 prices), with the industrial estate, shoe factory and leather goods factory showing estimated returns of 9.2 percent, 17.2 percent and 23.2 percent, respectively. The aggregate economic return for these components is estimated at 26.4 percent. The project has been designed specifically to cope with potential risks, including measures to ensure sound management, technical help, adequate training and marketing advice. The implementing agency is an established organization whose staff has gained considerable experience since the mid-1960's in the planning, construction, and management of diverse industrial plants. The project is also consistent with Tanzania's industrial development strategy and appropriate to the available resource base. No adverse environmental effects are anticipated from the project.

Date Approved: March 29, 1977 (IBRD)

RURAL DEVELOPMENT: This credit will help finance a project to be implemented over a five-year period consisting of inputs and improved extension services for crops and livestock in about forty villages; a low-cost water supply program and funding for a Water Master Plan; improvement of roads and strengthening of maintenance capacity; a reafforestation program; development of a land use plan; and technical assistance.

Borrower: United Republic of Tanzania.

Terms: $7.2 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $23.5 million equivalent.

Purpose & Benefits: The objective of this project is to develop the capacity of the Tabora region to absorb further investments. The overall rate of return for the project (excluding the water supply and master plan and land use planning components which amount to 36 percent of project costs) is estimated to be 17 percent. Direct benefits of the project include increased production of cotton, groundnuts, paddy, sorghum and beef, partly for consumption by the participating farmers and partly to increase the cash incomes of about 9,000 farmers involved with the crop and livestock components of the project. It is estimated that average per capita income of project farms will at least double from its present $40 equivalent a year level in five years. Total additional output stemming from the project will be relatively low because of the essentially pilot nature of the program. The road component will lead to savings in vehicle operating costs and agricultural production benefits from assured year-round supply of inputs and services and reduced crop spoilage. The water supply component of the project will provide improved supplies to 140,000 to 160,000 rural inhabitants by 1981, raising the proportion of Tabora's rural population so supplied from 23 percent to nearly one-third. Adequate water is also expected to help stabilize villages and encourage longer-term agricultural investment and production. The project is expected to have positive ecological effects. The monitoring and evaluation arrangements in the project will be particularly important in dealing with the uncertainties and potential problems which might arise in implementing this program. In view of the multi-sector and flexible nature of this project close supervision, especially in the start-up period, will be provided.

Date Approved: April 26, 1977 (IDA)

THAILAND

INTERMEDIATE CREDIT INSTITUTION: This World Bank loan will help cover the direct and indirect foreign exchange costs of industrial subprojects assisted by the Industrial Finance Corporation of Thailand (IFCT).

Borrower: The Industrial Finance Corporation of Thailand. *Guarantor:* Thailand.

Terms: $25.0 million equivalent. Term of 15 years with interest at 8.9 percent per annum.

Purpose & Benefits: Since the early 1970's the IFCT has developed into a sound institution employing rational project selection policies and procedures and endowed with good caliber management and staff. It plays a unique role in encouraging private sector investment in line with Thailand's overall industrial development strategy. A review of its pipeline of projects suggests that the IFCT is continuing to pursue sound goals. It has excellent rapport with the Government and is expanding relationships with the Thai financial and industrial communities. The IFCT has played a leading role in developing the Thai securities market. Its achievements notwithstanding, IFCT plans to continue to upgrade the quality of its staff and to diversify its activities (particularly in encouraging smaller scale industrial development). The availability of World Bank support for IFCT has helped significantly in its institutional growth. This loan will enable IFCT to continue sound growth while contributing to the development of Thailand's industrial sector. The internal economic rate of return on IFCT-financed projects has varied from 12 percent to 80 percent with the largest proportion concentrated in the 30 percent range. Internal financial rates of return have ranged between 12 percent and 42 percent with the bulk of the projects recording returns of around 25 percent.

Date Approved: September 14, 1976 (IBRD)

AGRICULTURE: This project is the first phase of a national program to strengthen Thai agricultural extension services by providing, in 33 of the 71 provinces, a streamlined extension organization; additional, well-trained extension personnel; improved extension methodology; and monitoring and evaluation programs. The project includes construction of 3 regional centers, 29 provincial and 285 district extension centers, the procurement of vehicles, equipment and materials, consultant services, fellowships, and overseas training tours.

Borrower: Kingdom of Thailand.

Terms: $28.0 million equivalent World Bank loan. Term of 20 years with interest at 8.5 percent per annum. Total project cost: $56.5 million equivalent.

Purpose & Benefits: Nearly 2.8 million farm families, cultivating some 4.3 million ha. of rice (54 percent of Thailand's total rice acreage) and about 2.4 million ha. of other crops will benefit from this project. Present yields on most crops are low but substantial increases can be achieved if farmers are made aware of, and use, available technology. It is not feasible to quantify with precision the likely benefits from this project but a rough calculation indicates it is well justified, with an estimated economic rate of return of 20 percent. In the past, extension services in Thailand have been provided largely on request and, typically, it has been the better educated and more affluent farmers who availed themselves of these services. As this project is designed to reach all smallholders in the provinces selected, it is expected to help narrow the gap in productivity between the poor smallholders and the more affluent farmers. With a small investment and annual operating cost per farm family ($20 and $4, equivalents, respectively), the viability of the project is ensured.

Date Approved: March 31, 1977 (IBRD)

IRRIGATION: This project is part of an on-going Thai Government program for improving irrigation facilities and supporting services to farmers in the Northern Chao Phya and Mae Klong Irrigation areas. Specific components of the project include: (a) rehabilitation of the main irrigation, drainage and road networks and on-farm development works; (b) rehabilitation works to improve water control and operational efficiency; (c) topographic and cadastral mapping of about 50,000 ha., construction of three pilot projects and 360 km. of service roads; and (d) consultant services.

Borrower: Kingdom of Thailand.

Terms: $55.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $112.0 million equivalent.

Purpose & Benefits: About 24,400 farm families (137,000 persons) live in the project irrigation rehabilitation area, with an average farm size of 2.3 ha. The degree of tenancy varies from 10 to 37 percent. These farms currently have average annual incomes of about $800 equivalent. After the project is completed, however, annual incomes should increase to about $1,700 equivalent. In addition, about 2,000 families of landless laborers will benefit directly from increased production and employment. At full project development, the incremental labor requirement is expected to be about 4.3 million man-days or some 15,000 full-time agricultural jobs. Most of the additional labor will be needed in the dry season when employment is otherwise at its lowest level. While no recent detailed population surveys have been made in other project areas, it is reasonable to assume that farm sizes and tenancy patterns are similar to the foregoing. The gross area involved is 138,000 ha. Assuming an average farm size of about 2.5 ha., 50,000 families can be expected to benefit from the project. The rate of return on this project as a whole is estimated at 31 percent.

Date Approved: June 28, 1977 (IBRD)

TOGO

TRANSPORTATION: This IDA credit will help finance: (a) reconstruction of the Aneho-Tabligbo road to two-lane paved standards (45 km.); (b) construction to gravel standards of the Agou-Notse road (51 km.); (c) purchase of road maintenance and workshop equipment; (d) provision of technical assistance to the Public Works Department (PWD) for road maintenance and road planning and design, and to the Ministry of Commerce and Transport (MCT) for overall transportation planning and coordination; (e) studies for improving Chemins de Fer du Togo (CFT) operations, and for organizing feeder road construction and maintenance; and (f) pre-investment studies of the Bassar-Mango road (137 km.).

Borrower: Republic of Togo.

Terms: $10.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $15.3 million equivalent.

Purpose & Benefits: The two roads to be built under this project will serve areas of considerable agricultural potential. The overall rate of return for those portions of the project with quantifiable benefits is 22 percent. The justification for reconstruction of the Aneho-Tabligbo road relates to vehicle operating cost savings—in 1974 the road carried an average of 362 vehicles per day of which 40 percent were trucks, and the remainder passenger cars. Based on a 20-year economic life and an annual traffic growth of 10 percent in the first 10 years following reconstruction and 5 percent thereafter, the economic return on the reconstruction of the road, which accounts for 38 percent of project costs, is estimated at 26 percent. The new Agou-Notse road will connect a food deficit area near Agou with a food surplus area near Notse. This road was first studied between 1970 and 1972, and was estimated at that time to have an economic rate of return of more than 10 percent,-based primarily on increased agricultural production from the area to be served by the road. Additional studies in 1976 indicate that construction of this road will have an even higher return—18 percent under conservative assumptions—because of other developments planned for the area. The institution-building aspects of the project are important although the benefits from this are much less tangible. Improving the transportation planning capabilities of the Ministry of Commerce and Transport is particularly appropriate since Togo will play an important role in the development of the West African regional transportation network serving the interests of both landlocked and coastal countries.

Date Approved: March 31, 1977 (IDA)

TUNISIA

INTERMEDIATE CREDIT INSTITUTION: This World Bank loan will help finance part of the Banque National de Tunisie (BNT) agricultural lending program over a period of about four years through the provision of medium- and long-term credit for the purchase by small farmers of equipment, seeds, dairy cattle and well and irrigation improvements, purchases by commercial farmers of heavier agricultural equipment, pure breed dairy stock and the construction and improvement of irrigation infrastructure, development of date palm plantations, and expansion of investment in other agro-industries, particularly olive oil mills.

Borrower: Banque Nationale de Tunisie (BNT). *Guarantor:* Tunisia.

Terms: $12.0 million equivalent. Term of 12 years with interest at 8.7 percent per annum.

Purpose & Benefits: With the exceptions of olive oil and dates, the additional agricultural production expected as a result of this project will be consumed locally. Half of the dates produced are to be exported and no marketing difficulties are foreseen, in light of the strong demand for the Degiat date in European markets. It is expected that the agreement signed by the Tunisian Government and the European Community in January 1976 to reduce import duties on olive oil will facilitate Tunisian exports but efforts will have to be made to improve the quality and presentation of Tunisian products as well as to diversify market outlets. The project average economic rate of return is 34 percent: individual component rates are 13 percent (date plantations); 36 percent (oil mills); and 38 percent (farm development). Based on 1976 input and output prices, the financial rates of return on investments under the project will range from 11 percent (date palm plantations) to more than 50 percent (fruit and vegetable development). The project is expected to create an estimated 1,300 man-years of additional family labor in farm development investments and date plantations and 350 new jobs in olive oil mills. Additional foreign exchange earnings will be generated from the improvements in the quality of exported olive oil. Of the 1,235 farmers expected to benefit directly from the project, more than three-quarters are small-scale farmers who will benefit from 48 percent of the World Bank loan and 53 percent of total project investment. About 38 percent of the beneficiaries, including members of small farmer associations, are in a rural poverty target group.

Date Approved: November 23, 1976 (IBRD)

POWER: This World Bank loan will help finance the gas-turbine component of the Societe Tunisienne de l'Electricite et du Gas (STEG) 1977–1981 program for the development of electricity generation capacity. The project consists of about 150 MW. in seven gas turbine units to be installed, two each, in Sfax (1977) and Menzel Bourguiba (1978), and one each, in Tunis South, Korba and Metlaoui (1980). The main objectives of the project are to ensure continuity of power supply, covering peak capacity needs, and to enable STEG to proceed with a later expansion program using larger and more efficient steam turbine units than would otherwise have been possible without prior installation of these gas turbine units.

Borrower: Societe Tunisienne de l'Electricite et du Gas (STEG). *Guarantor:* Tunisia.

Terms: $14.5 million equivalent. Term of 14 years with interest at 8.7 percent per annum. Total project cost: $29.3 million equivalent.

Purpose & Benefits: STEG's electricity sales since 1966 have risen at an annual rate of 11.5 percent. The forecast used for future system planning purposes projects an average annual growth rate of 13.3 percent for STEG's electricity sales and 12.5 percent for maximum demand during the period 1975 to 1981. This forecast, reflecting the planned economic expansion of Tunisia over the next few years is considered to be a reasonable basis on which to plan power system expansion. Two alternatives were considered as concerns the size of power generating units and installation timing. The program chosen calls for the installation and use of 150 MW. by these gas turbines through 1980, combined with two 140 MW. steam units at Sousse in 1981 and 1982. The estimated rate of return on this portion of the project, using low-heat value gas for the Sfax power plant, and gas oil for the other gas turbines, is at least 12.3 percent. If offshore gas, instead of oil, is used after 1980 for all gas turbines (except Sfax) the project rate of return would exceed 24 percent. Project rate of return is highly sensitive to variations in fuel costs and electricity rates, but relatively less sensitive to increased capital costs.

Date Approved: December 23, 1976 (IBRD)

MULTI-PURPOSE: This World Bank loan will help finance a multi-purpose project comprising construction of a 550 Mm³ capacity dam reservoir including a 25 MW. hydropower plant, a 126 km. interconnection canal from the El-Aroussia diversion 60 km. below the dam to the Cap Bon Peninsula, irrigation, drainage and road networks and land preparation in two new public irrigation areas (Testour/Medjez le Bab and Cap Bon) covering an area of 10,600 ha., rehabilitation works and 6,000 ha. of citrus plantations, and buildings, housing and equipment to operate and maintain project works. Training and consultant services for design, tendering and supervision activities and studies on water development and water policy issues will also be provided under the project.

Borrower: Republic of Tunisia.

Terms: $42.0 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $386.0 million equivalent.

Purpose & Benefits: This project is vital to implementing Tunisia's overall water development strategy. The benefits of the water supplies to be made available include increased agricultural output, higher incomes and employment for both family and hired labor, improved balance-of-payments, increased supplies of potable and industrial water to the major urban areas of Northern Tunisia, and an increased supply of electrical energy. The economic rate of return on project components (excluding power) is calculated to be about 11 percent. The direct economic benefits of the irrigation components of the project will stem from increased cropping intensity, increased yields, and crop diversification. By 1990, the average per capita income of the farming population in the project area, expressed in constant 1976 prices, is expected to increase from D 81 to D 320 in the Cap Bon irrigation perimeter, from D 125 to D 614 in Testour/Medjez, and from D 220 to

D 465 in the Cap Bon citrus plantation area. The principal beneficiaries of the project will be 8,000 farm families (48,000 people) operating mostly farms of less than 10 ha. Of the 8,000 farm families, nearly half are in the target group population. The project is also expected to create full-time agricultural employment for about 5,700 workers on State farms and production cooperatives in the new irrigation areas.

Date Approved: May 24, 1977 (IBRD)

WATER SUPPLY: This World Bank loan will help finance the construction of facilities to meet potable water needs in Tunis, Tunis-Sud, Beja, Jendouba, and Nabeul through the year 1990. The major components of the project are: (a) creation of production facilities including the Saida dam-reservoir, two pumping stations, transmission pipelines and a water treatment plant; (b) extension of the distribution system in Greater Tunis through the installation of two primary mains, the expansion and improvement of the secondary distribution network and upgrading of booster pumping stations; (c) the extension of distribution networks and upgrading of storage and booster pumping in Beja, Medjez-el-Bab, Pont du Fahs, and South Nabeul; and (d) execution of a study to assist the Societe Nationale d'Exploitation et de Distribution des Eaux (SONEDE) in developing and adapting management structures to future expansion needs.

Borrower: Republic of Tunisia.

Terms: $21.0 million equivalent World Bank loan. Term of 17 years with interest at 8.2 percent per annum. Total project cost: $102.9 million equivalent.

Purpose & Benefits: Nearly 40 percent of Tunisia's population and more than 45 percent of its urban dwellers reside in this project area where the water supply situation has become critical. Direct connections are installed in only 20 percent of homes in Nabeul, 18 percent in Beja and Tunis Sud and 12 percent in Jendouba. Furthermore, existing water production facilities can assure sufficient supply only until 1979. This project will help SONEDE meet its 1990 objective of increasing the proportion of the population served with direct house connections to 87 percent in Greater Tunis (about 75 percent at present), 85 percent in Beja, Jendouba and Tunis-Sud, and 75 percent in Nabeul. Installation of these piped water supply systems will also substantially improve sanitary conditions in these areas. Further development of industry and tourism in the five project areas also depends on the provision of adequate water supplies. Although the project will lead to an increase in wastewater, there is no immediate need for sewage treatment beyond the works now being carried out in Greater Tunis under a previous World Bank loan. The estimated financial rate of return for this project is 8.6 percent, without taking into account such benefits as health and environmental improvements.

Date Approved: June 2, 1977 (IBRD)

TURKEY

TOURISM: This project involves development of the South Antalya region of Turkey into a major resort for European mass tourism. The concept is to provide 2,250 rooms in hotels and vacation villages by 1981 and up to 5,750 rooms by 1990 in the area covering, inter alia, Beldibi-Tekirova, Kiziltepe, Tekerlektepe, Guneydeniz and Kemer. Sports and recreation facilities, improved road access, harbor craft, commercial and water-sports centers, excursion boats, improved telecommunication facilities, improved water supply and sewerage systems, electric power facilities, and related training and sports facilities are to be provided.

Borrower: Republic of Turkey.

Terms: $26.0 million equivalent. Term of 25 years with interest at 8.85 percent per annum. Total project cost: $66.0 million equivalent.

Purpose & Benefits: This project will have a favorable impact on Turkey's tight balance of payments situation. Incremental annual foreign exchange earnings are expected to be about $17.7 million equivalent in 1983 and to rise gradually to $29.3 million equivalent by 1993. The project will also have positive employment effects. A sizable number of construction workers (1,500) will be employed in the project area and when the project is fully operational employment for more than 7,000 workers in hotels and other tourism facilities is anticipated. Indirect employment generated in the construction, agriculture, handicrafts, transportation and other services involved should account for about 6,000 additional jobs. Assuming an economic life for the project of 25 years, the economic rate of return is estimated to be 17 percent.

Date Approved: July 6, 1976 (IBRD)

INTERMEDIATE CREDIT INSTITUTION: This (second) World Bank loan to the Devlet Yatirim Bankasi (DYB) will cover about 6 percent of that institution's projected commitments during 1977 and 1978. Proceeds of the loan are to be used primarily in manufacturing and processing industry projects and, to a limited extent, in non-fuel mining. The World Bank contribution to DYB's individual project financing will be up to a maximum of $9 million equivalent (compared to $6 million equivalent in the first loan), this increase being justified by the impact of inflation and the rising average size of new projects undertaken by Turkish State Economic Enterprises (SEE). World Bank resources are to be used only for foreign exchange costs and there will be a free limit of $2.0 million equivalent, with an aggregate free limit restriction of $14.0 million equivalent. Under the World Bank's first loan to the DYB, the financial and economic rates of return on subprojects financed with Bank funds were, in nearly every case, in excess of 20 percent.

Borrower: Devlet Yatirim Bankasi. *Guarantor:* Turkey.

Terms: $70.0 million equivalent World Bank loan. Repayable substantially in conformity with the aggregate of the amortization schedules for sub-loans, at 8.5 percent per annum.

Purpose & Benefits: This World Bank loan will continue assistance to the DYB in broadening and strengthening appraisal and supervision procedures, in playing an important role in SEE investment decisions and, by so doing, reinforcing its impact on Turkey's public sector. The objective of Bank association with DYB is to work within the existing SEE system toward eventual reform of public sector industry in Turkey. DYB is to continue to operate as an intermediary in financing economically sound projects and in carrying out innovative managerial and decision-making functions.

Date Approved: March 15, 1977 (IBRD)

INTERMEDIATE CREDIT INSTITUTION: The objectives of this World Bank loan (and an associated $50 million equivalent IFC loan) are to encourage the Tukiye Sinai Kalkinma Bankasi A.S. (TSKB) to continue its regional development efforts, to substantially increase the amount and proportion of its lending to small-to-medium-sized labor-intensive industries, to further reinforce its role in the non-financial aspects of development banking (technical assistance services), and to increase and diversify its domestic and foreign resource mobilization.

Borrower: Turkiye Sinai Kalkinma Bankasi A.S.
Guarantor: Turkey.

Terms: $74.0 million equivalent World Bank loan repayable substantially in conformity with the aggregate of the amortization schedules for sub-loans and investments with a maximum period of 15 years and with interest at 8.20 percent per annum.

Purpose & Benefits: TSKB has a 25-year record as a well-managed, profitable and financially sound institution. Its success in directing resources to, and encouraging ownership of, industries in the less developed regions of Turkey has been of considerable economic benefit to that country. TSKB has also performed valuable services by undertaking industrial sub-sector studies and participating in studies on Turkey's financial sector. TSKB's new program of devoting a fixed amount of financial resources, together with technical assistance, to relatively small, labor-intensive industries will have a direct impact on Turkish Government efforts to reduce unemployment. TSKB has made substantial progress recently in tapping the international capital markets—an attestation to its acceptance as a credit-worthy borrower. The related IFC loan ties in with one of the main objectives of the World Bank loan, which is to increase and diversify TSKB's resource mobilization efforts in capital markets.

Date Approved: May 24, 1977 (IBRD)

UPPER VOLTA

HIGHWAYS: This credit will help finance a project, to be carried out during the period 1976 to 1979, involving reconstruction to paved standard of the 183 km. Banfora-Bobo Dioulasso-Hounde road, procurement of vehicle weight control and traffic counting equipment, consulting services for a road maintenance study and pre-investment studies for about another 150 km. of roads to be selected, and technical assistance for strengthening Upper Volta's Directorate of Transport and assisting the Government in the promotion of Upper Volta's domestic civil works industry.

Borrower: Republic of Upper Volta.

Terms: $20.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $29.2 million equivalent.

Purpose & Benefits: Upper Volta's development strategy is based to a significant degree on developing the southwestern region of the country. Improvement of the Banfora-Bobo Dioulasso-Hounde road under this project supports the regional development effort although this road's contribution to development is complex, since it will be carrying traffic related to virtually every aspect of economic activity. This road section is also part of Upper Volta's major transport axis connecting the commercial center of Bobo-Dioulasso with the capital, Ouagadougou. In addition, it is a segment of the major international route south to the coast at Abidjan and north, through Upper Volta, to eastern Mali. The economic rate of return is calculated only for the road component of the project. The maintenance study and technical assistance components of the project also have major benefits, but these cannot be quantified. The economic return from paving the road was derived from vehicle operating and maintenance costs savings. Benefits from time savings, accident reduction, and flood control in the vicinity of the road embankment were omitted from this calculation. On this basis, the economic return from the roadway improvement is about 18 percent overall, with the first year's return being estimated at about 13 percent. Under sensitivity tests, the rate of return on individual sections of the project road was greater than 13 percent, dipping below 10 percent only if project costs were increased 45 percent or if benefits fell by 30 percent or more relative to costs. The economic rates of return are considered high enough from vehicle operating and maintenance cost savings to absorb any reasonably probable combination of adverse circumstances. Agricultural freight transport accounts for most of the project's benefits. The majority of passenger transportation is for business purposes. Evidence of trucking industry competition during the non-agricultural season in Upper Volta suggests further that most of the benefits of lower transportation costs will be passed on to other sectors of the economy.

Date Approved: July 1, 1976 (IDA)

AGRICULTURE: This project, to be carried out over the five year period 1977 to 1981, includes strengthening the rural development agencies in Upper Volta through technical assistance and training and the provision of staff, equipment and transportation needed to implement an agricultural development program. Under the project additional seasonal inputs (seed, fertilizer and insecticides) will also be provided, small-scale irrigation systems totaling 1,120 ha. will be built as will also a 22,000 ton ginnery with storage facilities, 75 small village grain stores, a training center for a livestock project, and studies and surveys executed, including a pilot project to improve the situation of women in about 40 villages.

Borrower: Republic of Upper Volta.

Terms: $3.6 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $8.9 million equivalent.

Purpose & Benefits: The principal direct economic benefits of this project will be an increase in cotton and cereal production. The economic value of this incremental production (at 1976 prices) is estimated at $5.7 million equivalent annually for cotton, and $7.8 million equivalent annually for cereals at full project development. Cotton is one of Upper Volta's important sources of foreign exchange earnings; the project is expected to add about 9,800 tons to the present production of 16,000 tons of cotton lint which, at 1976 prices, would represent higher net foreign exchange earnings of about $11.0 million equivalent. About 46,500 families will benefit directly from increased crop production which will, in turn, lead to higher farm incomes. Improved roads and women's activities will indirectly benefit about 30 percent of farmers in the project area. The economic rate of return for this project is calculated at 30 percent over a period of 15 years.

Date Approved: May 3, 1977 (IDA)

YEMEN ARAB REPUBLIC

AGRICULTURE: This project is the first major element in Yemen Arab Republic (YAR) Government efforts to encourage livestock development and production, introduce modern production and marketing techniques and create effective institutions for livestock resource and range improvement. The project includes setting up a national Livestock Development Corporation (LDC—a semi-autonomous, government-owned commercial enterprise) which will establish several 50-cow dairy farms, a livestock fattening colony, a poultry unit and a feed mill and construction and development of three urban slaughterhouses and related municipal market facilities. Hides and skins improvement and meat inspection services are also to be included as is support of animal health services and the provision of supervised credit to traditional landowners, smallholder livestock and poultry owners, and irrigated fodder crop producers.

Borrower: Yemen Arab Republic.

Terms: $5.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $32.0 million equivalent.

Purpose & Benefits: This project will provide substantial benefits to about 1,000 participating livestock producer families and to the national economy. It is expected to lead to substantially reduced animal mortality rates and improved management practices and higher rural incomes. Substantial additional output of livestock products will evolve from this project: 26,000 tons of milk, 7,000 tons of meat, and 1,000 tons of eggs per year—or foods equivalent to 20 percent of the YAR's total projected deficit in animal products by 1985. Considerable foreign exchange savings are also anticipated: by the fifth year of the project, the annual average value of milk and meat production from the project will be about $15 million equivalent. In addition, there are to be substantial non-quantifiable benefits such as the improvement of public health and the training of Yemeni citizens in diverse skills. The overall economic rate of return for the project is estimated at about 27 percent.

Date Approved: October 19, 1976 (IDA)

WATER SUPPLY AND SEWERAGE: This IDA credit will help finance the extension of the water supply system now being built to serve the Sana's population; the construction of the first phase of a master sewerage plan covering the city's needs up to the year 2000; the preparation of feasibility studies for water and sewerage facilities in the towns of Ibb and Dhamara; and technical assistance to the local construction industry.

Borrower: Yemen Arab Republic.

Terms: $10.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $45.8 million equivalent.

Purpose & Benefits: This project is essential if Sana's city's basic needs for safe water and adequate disposition of sewerage are to be satisfied. The water supply project, coupled with an earlier one now being implemented, will serve about 80 percent of the city's population through direct connections by 1980. The remainder of the population will be served by easily accessible public taps and adequate water supplies will also be made available for commercial and industrial use. The sewerage project will benefit primarily the low income population. Both the water supply and sewerage elements in this project are the least-cost solutions among the several feasible alternatives examined. If net revenues from water sales and sewerage charges are taken as benefits, the internal economic rate of return of the project will be 8.9 percent. (The rate of return is 13.4 percent for the water supply component and 4.6 percent for the sewerage.) The rate of return is significantly sensitive to water sales levels and moderate increases in capital investment would not affect the expected return significantly. In the unlikely event of a 20 percent decrease in water sales and an increase of 20 percent in the capital investment the project rate of return would be four percent—still an acceptable level, considering the project's substantial social benefits.

Date Approved: December 21, 1976 (IDA)

TRANSPORTATION: This project will help the Yemeni Ports and Marine Affairs Corporation (PMAC) expand and rehabilitate port facilities at Hodeidah and Mocha and strengthen its management and staff. Project components include: the repair of existing berths, construction of a new berth, slipway and jetties for harbor craft, dredging of the harbor channel and basin, rehabilitation and improvement of the oil terminal, the addition of new buildings and utilities, and the purchase of cargo-handling equipment and floating craft (Hodeidah); and rehabilitation and refendering of the pier face, construction of new buildings and utilities, and the purchase of cargo-handling equipment and navigational aids (Mocha). Technical assistance to the PMAC is also to be provided under this project.

Borrower: Yemen Arab Republic (YAR)

Terms: $6.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $27.9 million equivalent.

Purpose & Benefits: Most of the YAR's foreign trade passes through its ports, primarily Hodeidah and Mocha. Total port traffic in 1976 consisted of 0.8 million tons of general cargo and about 0.3 million tons of liquid petroleum products. Traffic (mostly imports) at Hodeidah underwent a sudden and explosive increase (about 39 percent) leading to ship waiting times of over three months and causing shipping companies to impose congestion surcharges. Traffic is projected to increase rapidly over the next few years, to more than double in volume by 1985 (to about 2.5 million tons). The facilities to be provided under the on-going programs by the Government and by this project are expected to reach optimum utilization at that time. The project will produce benefits through savings in foreign exchange (by avoiding demurrage) due to reduced ship-waiting and service time as a result of the increased port and throughput capacity; economies of scale from the use of larger ships for bulk grain and petroleum products; savings from reduced cargo damage; and savings in internal transportation costs in using Mocha for serving the Taiz area. The economic rate of return on the project is estimated to be more than 41 percent, with a first year return of 18 percent. Separate analyses for the Hodeidah and Mocha project investments indicate returns of about 40 percent for Hodeidah, and a higher yield for Mocha.

Date Approved: May 19, 1977 (IDA)

YUGOSLAVIA

WATER SUPPLY: The principal components of this project are: (a) construction of the Radenic Dam; (b) building a diversion weir, intake works and a feeder canal from the Decanska Bistrica River; (c) installing water supply works for three towns and twelve villages; (d) building an irrigation distribution system; and (e) provision of miscellaneous works including drainage, erosion control, soil improvement, power supply lines, equipment, farm roads, buildings, demonstration farms and consultant services.

Borrower: Vodoprivredna Organizacija Methohija (Water Management Organization Methohija—VOM). *Guarantor:* Yugoslavia.

Terms: $54.0 million equivalent World Bank loan. Term of 15 years with interest at 8.7 percent per annum. Total project cost: $88.3 million equivalent.

Purpose & Benefits: The principal beneficiaries of the irrigation component of this project will be about 2,200 smallholder and poor private farmers and their families whose average current per capita income is estimated at about $150 equivalent. At full project development (1985), however, the project is expected to increase this level of per capita income by about 170 percent to $412 equivalent (1975 prices). The project will also increase profits and incomes in the social sector, reduce instability in crop production and help provide a cheaper source of sugar beets for local processing. Indirect beneficiaries include other residents of Kosovo by way of increased availability of domestically produced goods. Underemployment—particularly of smallholder private farmers—is expected to diminish as labor productivity increases. The water supply component of the project, by providing new sources of hygienic water, will benefit the entire population of the project area (presently, 64,700) as well as the social sector industrial enterprises and livestock owned by private farmers. The economic rate of return on all project components is estimated at about 11 percent.

Date Approved: January 11, 1977 (IBRD)

AGRICULTURE: These two projects will help achieve the agricultural objectives of Montenegro and Macedonia of increasing agricultural production for the growing domestic market and for export, raising productivity and incomes (particularly on small farms), expanding agro-industrial processing capacity, improving product quality, and stabilizing food supplies.

Borrowers: Investiciona Banka Titograd (IBT) (Montenegro); Stopanska Banka Skopje (SBS) (Macedonia). *Guarantor:* Yugoslavia.

Terms: Montenegro: $26.0 million equivalent World Bank loan. Term of 15 years with interest at 8.5 percent per annum. Total project cost: $55.6 million equivalent. Macedonia: $24.0 million equivalent World Bank loan. Term of 15 years with interest at 8.5 percent per annum. Total project cost: $56.0 million equivalent.

Purpose & Benefits: These World Bank loans will help finance agricultural investments in two of the less-developed regions of Yugoslavia where per capita incomes are about 30 percent below the Yugoslav national average. In Macedonia, about ten social sector enterprises, comprising 6,840 workers plus 1,200 workers for whom new jobs will be created, and 960 private farm families are to receive credit under the project. In addition, about 1,150 private farm families will be directly involved, bringing to a total of about 2,100 the number of small farm families that the project is to benefit directly. Of these, 1,350 are in the target low income group with annual per capita incomes below $340 equivalent. These incomes are expected to increase by about 40 percent for mechanization investments and by up to 130 percent for livestock farmers. Annual additional income to social sector enterprises in Macedonia at full project development will be $28 million equivalent. In Montenegro, the annual incremental income of the Agrokombinat, comprising 2,800 workers plus 630 jobs to be created under the project, is estimated at $7.5 million equivalent, thereby raising the income of workers' families by an average of about 55 percent. The investment cost per beneficiary family for both projects will average about $2,300 equivalent. The processing investments under both projects will provide indirect benefits by creating marketing outlets for incremental production to some 21,300 private farmers in Macedonia and about 170 private farmers in Montenegro, more than half of which fall in the low income target group. The Montenegro project will have a 17.3 percent economic rate of return while the Macedonian project rate of return is estimated at 25.6 percent.

Date Approved: February 22, 1977 (IBRD)

TRANSPORTATION: This World Bank loan will help finance a project involving: (a) construction of highway sections in the Republics of Serbia, Bosnia-Herzegovina, and Macedonia and in the Province of Kosovo; (b) studies of Yugoslav road-user charges and rail costs; and (c) technical assistance for a highway master plan for Kosovo Province.

Borrower: Srbije, Sarajevo, Makedonija, Kosovo, Pristina. *Guarantor:* Yugoslavia.

Terms: $56.0 million equivalent. Term of 15 years with interest at 8.5 percent per annum. Total project cost: $179.0 million equivalent.

Purpose & Benefits: The principal direct beneficiaries of this project will be road users who, due to the diversity of highway traffic, represent a wide range of sectors and income groups. The roads will benefit both long-distance and local traffic and beneficiaries will thus also include international truckers and tourists, with the result of stimulating the foreign exchange earning potential of Yugoslavia as a whole. The major commodities which will be transported on the improved roads are raw and processed agricultural goods, construction materials, wood and wood products, fuels, chemicals and other manufactured goods. Because Yugoslav transportation enterprises are highly competitive and generally well managed, the anticipated reductions in transportation costs derived from completion of this project will be passed on gradually to producers and consumers. Investments in the various project road sections are expected to yield economic rates of return ranging from 15 to 62 percent, with an overall weighted average of 23 percent. These returns, however, understate the full economic benefits of the project by not taking into account reductions in accidents, greater comfort and the convenience of travelling on new and improved roads.

Date Approved: March 15, 1977 (IBRD)

POWER: This project constitutes the second phase of a 380-kV. power transmission network. The project comprises construction of about 1,000 km. of single circuit transmission lines, 16 new substations and the extension of eight existing substations with a total transformer capacity of about 10,000 MVA., three switching stations, and nine dispatch centers. The project will also include studies of management, tariffs, and system development. This is an extension and refinement of the basic power grid established under a first phase power transmission project in 1972 and will serve to meet demands in areas where the existing 220-kV. and 110-kV. systems are rapidly approaching their rated capacity.

Borrower: Six electric power organizations in the Republic of Bosnia-Herzegovina, Croatia, Macedonia, Montenegro, Serbia and Slovenia. The loan will be distributed among the six borrowers in proportion to the estimated cost of the project within the respective Republics.

Terms: $80.0 million equivalent World Bank loan. Term of 15 years with interest at 8.2 percent per annum. Total project cost: $681.0 million equivalent.

Purpose & Benefits: This project will play a key role in achieving the two major goals of Yugoslavia's national energy policy of ending perennial power deficits by the end of this decade and making maximum use of domestic energy resources. Installed power generating capacity is expected to reach about 18,700 MW. by 1982 and this expansion will be based essentially on generating plants utilizing Yugoslavia's principal primary energy sources—hydropower and coal (mostly lignite). The location of generating plants is dictated largely by the location of these primary energy resources which are spread unevenly throughout the country. The 380-kV. system expansion to be effected under this project is the least-cost means of connecting dispersed sites and transmitting energy to load centers. Power exchange is desirable in economic terms because of the benefits stemming from the scale of operations, reduced reserve margins and fuel savings resulting from the economic loading of plants. The rate of return on Yugoslavia's overall power development program for the period 1976 to 1982 is estimated at 13.6 percent.

Date Approved: June 28, 1977 (IBRD)

ZAIRE

AGRICULTURE: The proceeds of this credit will help finance the rehabilitation of cotton production in the Ubangi and Mongala sub-regions of the Equateur Region of Zaire. Components of the project include the administrative and financial reorganization of the cotton buying system, a road improvement program, improvements in the agricultural extension service, construction of housing and procurement of vehicles, an organization and management study of the Office National des Fibres Textiles (ONAFITEX), development of insect control programs, rehabilitation of a research station and the existing ginneries, and execution of studies for possible future projects.

Borrower: Republic of Zaire.

Terms: $8.0 million equivalent. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $14.6 million equivalent.

Purpose & Benefits: The principal benefits from this project will be increased foreign exchange earnings from cotton exports and increased income for cotton farmers, many of whom have no alternative sources of cash earnings. The improved cotton transportation, marketing and extension services to be provided under the project are expected to raise cotton yields from the current average level of 200 kg/ha. to about 350 kg/ha. per annum in the fourth year of the project. Overall production of seed cotton in the area is expected to increase from the present annual level of 4,500 tons to 12,600 tons in the same period. The net incremental production value involved is estimated to be about $3.1 million equivalent. The Government will also collect additional tax revenues from the cotton lint to be exported. Some 84,000 farmers are expected to benefit from the project and it is expected that their cash incomes will almost double. Finally, the scheduled road improvements will bring additional benefits to the Equateur Region as a whole. It is estimated the project will generate a cumulative net operating surplus for ONAFITEX of about $1.2 million (equivalent) by the fifth year of the project and continue thereafter to generate a positive cash flow which will be made available to the Government for further cotton development and the partial recovery of its contributions to project start-up costs and operating capital. The economic rate of return on the project is estimated at 23 percent.

Date Approved: September 21, 1976 (IDA)

AGRICULTURE: This IDA credit will help finance a livestock development project which includes: (a) rehabilitation of veterinary and animal production services in Ituri; (b) improvement of marketing services, a stock route and rural slaughter facilities; (c) rehabilitation of buildings at a research station to serve as a training center for project staff and participating farmers; (d) development of three ranches for fattening cattle and improving local breeding stock; (e) improvement of several existing abattoirs; and (f) execution of studies of the livestock sector and studies needed to prepare future projects in this sector.

Borrower: Republic of Zaire.

Terms: $8.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $15.5 million equivalent.

Purpose & Benefits: The main quantifiable benefit of this project will be a substantial increase in beef and milk production with an estimated value of $9.2 million equivalent per year at full project development. The added milk production is to be consumed in the Ituri area while incremental beef production (estimated at the equivalent of 4,000 tons of carcass meat) will be equal to about 22 percent of Zaire's domestic meat output in 1975 and will lead to net annual foreign exchange savings of about $4.6 million equivalent at world market prices. Eighty percent of this increased production will be attributable to the smallholder development scheme with the balance to come from the ranch rehabilitation program. Other project benefits include improved nutrition for approximately 26,000 families; more hygienic slaughtering of animals; the development of local expertise in livestock production and improved extension services, the demonstration effects of improved pasture and land management techniques; and field testing of extension methods for smallholder development schemes which may be of wider applicability. The overall economic rate of return for this project is estimated to be 29 percent.

Date Approved: April 12, 1977 (IDA)

INTERMEDIATE CREDIT INSTITUTION: This IDA credit will cover about 45 percent of Societe Financiere de Developpement (SOFIDE) foreign exchange requirements through the year 1978. SOFIDE is to relend the funds at a minimum rate of 12.5 percent per annum. SOFIDE will also pay the Government a commitment charge of 0.75 percent per annum on the undisbursed amount of the credit. Large enterprises borrowing from SOFIDE will be required to assume the foreign exchange risk but the Government of Zaire will bear these risks in the case of small enterprises (with assets less than $250,000 equivalent).

Borrower: Republic of Zaire.

Terms: $10.0 million equivalent IDA credit. Term of 50 years with a service charge of 0.75 percent per annum.

Purpose & Benefits: The most urgent problem facing the industrial sector in Zaire is the rehabilitation of medium- and large-scale enterprises following the measures of retrocession. These are activities which SOFIDE is expected to concentrate on in the near future. To accomplish this task, SOFIDE will be strengthening its relationships with the Investment Commission and the Government is to take steps to insure appropriate coordination in this regard. Assistance to small-scale enterprises remains a major objective of SOFIDE but, because of the high risks of lending in this sector SOFIDE will restrict its lending to such enterprises as bakeries, saw mills and transportation where risks are at acceptable levels. SOFIDE's equity investment portfolio will increase moderately, perhaps by becoming the representative of Zaire's interests in new joint ventures with foreign investors. This IDA credit will cover the bulk of a $10 million equivalent foreign exchange resource gap. SOFIDE will need to obtain about $3 million equivalent from other sources and for this purpose has already contacted a number of other foreign and international lending agencies. Sufficient resources are expected to be available to cover SOFIDE's local currency requirements from cash flow, operations, increases in capital and quasi-capital, and rolled-over IDA funds.

Date Approved: May 12, 1977 (IDA)

ZAMBIA

PROGRAM LOAN: This World Bank loan will help finance the minimum level of imports required to maintain reasonable levels of production in Zambian agriculture, manufacturing and mining, and to support the investment program of the Zambian Government. Foreign exchange resources from the loan are to be used to import raw materials, chemicals, intermediate goods, machinery and transport equipment. Iron and steel, agricultural machinery, railway equipment, machine spares and trucks are among the specific major items to be financed. Manufactured fertilizers, consumer goods, luxury items and fuel are not to be financed with the proceeds of this loan.

Borrower: Republic of Zambia.

Terms: $30.0 million equivalent. Term of 17 years with interest at 8.9 percent per annum.

Purpose & Benefits: In negotiating this loan, the World Bank secured undertakings from the Zambian Government on several important issues. First, it was agreed that the Government is to take steps substantially to strengthen the Ministry of Rural Development and the underlying provincial administrative structure. A supplementary budget for these purposes has recently been approved to increase fiscal allocations to rural development by K2.7 million. The Zambian Government also agreed to the importance of ensuring that price mechanisms play an appropriate role in the allocation of resources and the production process in the agricultural sector. The Government is to review agricultural commodity price structures and production inputs on a periodic basis and will take the steps necessary to maintain adequate price incentives for production. Furthermore, these price levels are to be announced well in advance of planting seasons in order to allow farmers sufficient time to plan production. Finally, World Bank and IMF missions have discussed with the Zambian Government the need for curbing rapid growth in recurrent expenditures and for providing more stable expansion of Government development expenditures. To attain these objectives, the Government has agreed that in the future recurrent expenditures will be covered by non-mineral revenues. All mineral revenues and surpluses from the current budget will be used to finance capital expenditures.

Date Approved: September 7, 1976 (IBRD)

EDUCATION: The proceeds of this World Bank loan will assist in financing the improvement of Zambian education administration, research, and curriculum development through the construction, furnishing and equipping of the second stage development of an Education Services Center; the expansion and improvement of business education through additional capacity and equipment for the Commercial College and equipment for commercial and secretarial courses at five Trades Training Institutes; the improvement of training for agricultural staff and farmers in eight Farm Institutes and 20 Farmer Training Centers; and technical assistance and fellowships, evaluation studies, and a survey of the construction industry.

Borrower: Republic of Zambia.

Terms: $13.3 million equivalent. Term of 17 years with interest at 8.7 percent per annum. Total project cost: $23.2 million equivalent.

Purpose & Benefits: This project will lead to an increase in the supply of middle and advanced level manpower (in particular, accountants) for business and commerce, create opportunities for training an additional 13,400 farmers and farm-women in the Farmer Training Centers and improve the in-service training capabilities of the Farm Institutes for agricultural extension staff. The project will, for the first time, enable full coordination and administration of the educational services which have been developed in Zambia since Independence. Improved educational research, evaluation and guidance should help bridge the gaps between the school system and labor market needs. A special feature of the project is technical assistance and staff development for the Commercial College which will permit, over a period of six years, Zambianization of a hitherto 100 percent expatriate Business Studies Department faculty. Training of farmers is to be improved through better qualified instructors and extension

ZAMBIA—Continued

agents. In order to minimize risks in this project, adequate technical assistance and evaluation studies are to be provided.

Date Approved: December 26, 1976 (IBRD)

INDUSTRY: This industrial forestry project consists of: (a) planting, over a five-year period, about 3,500 ha. of new plantations annually, of which about 3,000 ha. will be pine and about 500 ha. eucalyptus; (b) reforestation with eucalyptus of approximately 400 ha. annually of clearfelled plantations; (c) maintenance of Industrial Plantations Division (IPD) plantations; (d) doubling IPD's logging and transportation capacity from about 60,000 m^3 to about 120,000 m^3 of roundwood per year; (e) building and equipping a sawmill with a sawnwood capacity of about 40,000 m^3 annually; (f) staff training and fellowships; and, (g) research, experimentation and studies designed to improve land clearing and charcoal production methods.

Borrower: Republic of Zambia.

Terms: $16.8 million equivalent World Bank loan. Term of 20 years with interest at 8.2 percent per annum. Total project cost: $34.5 million equivalent.

Purpose & Benefits: This project supports Zambia's long-term afforestation program by helping to finance the planting of 15,000 ha. of pine, 2,500 ha. of eucalyptus and the replanting of about 2,000 ha. of clearfelled plantations. The associated sawmill will add about 40,000 m^3 annually to existing sawnwood milling capacity. Through import substitution, Zambia will be in a position to save an average of about $1.2 million equivalent per annum in foreign exchange during the first ten years of the project rising thereafter to about $15.3 million equivalent in year fifteen. The project has been evaluated in terms of Zambia's planned industrial forestry program, including a pulp and paper mill. On this basis, the financial rate of return is estimated at 11 percent and the internal economic rate of return at 20 percent.

Date Approved: May 12, 1977 (IBRD)

INTER-AMERICAN DEVELOPMENT BANK

ARGENTINA

INDUSTRY: The project to be financed in part with the proceeds of this IDB loan involves the extension of the Southern Pipeline to convey natural gas from sources in Tierra del Fuego to the mainland in the Province of Santa Cruz. It includes building a gas pipeline (approximately 200 km. long) with an initial capacity of three million cubic meters per day consisting of two overland sections (one on the island of San Sebastian and the other on the mainland near Cabo Virgenes) connected by an underwater section in Argentine territorial waters in the Straits of Magellan. Complementary facilities for operating and maintaining the pipeline encompass access roads, housing, workshops, communications equipment, and compressor plants to permit expansion of pipeline carrying capacity.

Borrower: Republic of Argentina.

Terms: $87.0 million equivalent from Ordinary Capital resources. Term of 20 years with interest at 8.6 percent per annum. Total project cost: $191.7 million equivalent.

Purpose & Benefits: Argentina's energy program is designed to foster the more intensive use of the country's natural gas reserves to meet growing household demand and gradually to replace fuel oil in industry in order to curb crude oil imports. Argentina's proven reserves of natural gas were estimated at 201 billion cubic meters in 1974. Prospects for increasing these reserves from sources now being developed and through research are bright, particularly in the Neuquen and Tierra del Fuego regions. It is not expected that Argentina will have major problems in providing a regular supply of gas to the consumer market over a reasonable period of time (25 to 30 years). Industry accounts for approximately 50 percent of Argentina's natural gas consumption, the balance being absorbed about equally by the residential-commercial sector and by electric power plants. Studies indicate that gas consumption will be about 22.1 million cubic meters per day by 1976 and nearly double, to 40.0 million cubic meters per day, by 1984. Because of the possibilities for using gas as a substitute for fuel oil in large industrial plants and power stations, the outlook for sales depends primarily on actual availabilities of gas.

Date Approved: August 12, 1976 (IDB)

AGRICULTURE: The proceeds of this IDB loan will help finance a credit program to build, expand and modernize Argentine grain storage facilities. The Banco de la Nacion Argentina (BNA) will be the executing agent of the Government of Argentina for this program and will extend loans to agricultural producers, cooperatives and private entities associated with the production and marketing of grains to expand facilities for the bulk storage of grain. The new silos, machinery and equipment to be acquired with resources under this program must be utilized or installed on the farm or farms owned by the beneficiary or, with authorization, on public lands. Plans and specifications for the new equipment and its installation are subject to prior approval by the BNA's Comision Tecnica de Silos.

Borrower: Republic of Argentina.

Terms: $60.0 million equivalent from Ordinary Capital Resources. Term of 20 years at 8.6 percent interest per annum. Total project cost: $124.4 million equivalent.

Purpose & Benefits: Cereals and grains loom large in Argentine agricultural production and exports. In 1975, grains accounted for 26 percent of agricultural production and 36 percent of total exports. Annual average cereal and grain production during the period 1971–76 was 22.6 million tons. Cereal exports in 1975 were valued at $1.068 billion, compared with $1.339 billion exported a year earlier (U.S. $ equivalents). Available grain storage installations have a capacity of 14.5 million tons, equivalent to 63 percent of average annual grain production during the 1971–76 period. This capacity does not meet the basic requirements of the marketing process—estimated by Argentine technicians at 75 percent of production or 17.6 million tons. Limited storage capacity thus forces Argentina to market all of its grain production in the same year it is harvested, regardless of world market conditions and does not permit accumulation of carry-over stocks between harvests, either to absorb production surpluses or avoid unfavorable market conditions. The program is expected to increase bulk grain storage facilities in Argentina by about 2 million tons, or a 14 percent increase over existing storage capacity.

Date Approved: November 4, 1976 (IDB)

INDUSTRY: This loan and complementary line of credit will help finance the installation and operation of a plant designed to operate at full capacity for alternative, or combined, production of unbleached, semi-bleached and bleached cellulose. The major components of the project will be: (a) one factory section for primary mechanical treatment of lumber; (b) one factory section for pulp digestion, refining and cleaning, and (c) one factory section for bleaching, refining and drying cellulose. Supplementary installations in the project include facilities for the recovery of reagents, production of lime, a section to generate chlorine dioxide, a water treatment plant, acquisition of a turbogenerator to meet the plant's electric power needs, installations to treat and process effluents, port facilities, and urban infrastructure. In addition, approximately 8,000 hectares of land for forestation and about 6,000 hectares of planted forest will be acquired to achieve about 30 percent self-sufficiency for the plant's wood requirements.

Borrower: Alto Parana, S.A. *Guarantor:* Banco Nacional de Desarrollo.

Terms: $51.0 million equivalent loan from Ordinary Capital resources. Term of 15 years with interest at

8.6 percent per annum. Also, $32.0 million equivalent renewable supplementary line of credit with terms to be negotiated. Total project cost: $349.5 million equivalent.

Purpose & Benefits: The objective of this project is to install a plant to produce 50 metric tons of long-fiber chemical cellulose from pine lumber daily. The output from the plant will replace current and projected imports of this type of pulp with emphasis on the consumption needs for bleached and semibleached pulp of the eight stockholder companies. Other project goals include contributing to the rational development of the forestry potential in the Province of Misiones which is the major conifer forestry center of Argentina. The project will also contribute to regional development by creating about 450 new jobs and by the construction of housing and community facilities, a port and interior roads and access roads to the plant.

Dates Approved: December 27, 1976 (IDB loan); March 24, 1977 (line of credit)

BARBADOS

EDUCATION: This project consists of building and equipping a new structure to house the Samuel Jackman Prescod Polytechnic Institute (SJPPI). The aim is to provide the Institute with centrally located and improved facilities so as to accommodate a substantial increase in enrollment in new courses closely related to employment opportunities in Barbados. Other elements of the project are to expand and improve the administrative and didactic capabilities of SJPPI staff, create vocational guidance, counseling and employment services, and strengthen the Ministry of Education and the SJPPI in financial administration, organization, planning and manpower demand analysis.

Borrower: Barbados.

Terms: $6.6 million equivalent from the Fund for Special Operations. Term of 35 years with interest at 2 percent per annum. Total project cost: $9.5 million equivalent.

Purpose & Benefits: During the last few years, the Government of Barbados has utilized an annual average of more than 21 percent of its budget expenditures for the Ministry of Education—Ministry spending has averaged nearly 8 percent of annual Gross Domestic Product over this period. Nearly all children between the ages of 5 and 11 attend public primary schools. As a consequence, literacy in Barbados is, for practical purposes, universal. However, about 80 percent of those who enter the secondary school system leave after the first 3-year cycle to seek employment but without having acquired the skills needed for employment. The unemployment rate is thus very high, being unofficially estimated at about 14 percent. Studies over the past few years nonetheless demonstrate substantial unsatisfied local demand for workers ranging in capability from semi-skilled to skilled in a variety of employment fields. Barbados' principal secondary level vocational institution, the SJPPI, cannot accommodate all applicants and is, furthermore, dispersed in three locations, none of which is specifically designed or adequately equipped for effective vocational training. This project should help the SJPPI offer technical and vocational instruction which responds adequately to the requirements of local employers and the needs of its students.

Date Approved: July 8, 1976 (IDB)

EDUCATION: This IDB program will help finance a permanent Student Revolving Loan Fund (SRLF) through which long-term credits (up to 18 years) at concessional interest rates (5 percent per year) will be granted to qualified Barbadian students from families of limited educational resource availabilities to finance post-secondary education in fields determined to be of priority to the continued social and economic development of the country. The program is designed to provide educational credits to some 169 beneficiaries for studies in an estimated 20 priority areas of study.

Borrower: Barbados.

Terms: $800,000 equivalent from the Fund for Special Operations. Term of 35 years with interest at 2 percent per annum. Total project cost: $1.0 million equivalent.

Purpose & Benefits: This program will provide Barbados with a mechanism for reducing the financial burden of providing scholarships, grants and awards for post-secondary education by making repayable credits available to qualified beneficiaries to finance studies in specific professional and technical careers determined to be of priority importance to continued economic and social development of the country. The availability of scholarships has decreased markedly in recent years principally because of the phasing-out of grants formerly provided by the Canadian International Development Agency as well as because of a reduction of the number of grants and awards made by the Ministry of Education due to budgetary constraints. The IDB resources furnished under this loan will help fill this educational financing gap.

Date Approved: February 17, 1977 (IDB)

BOLIVIA

PREINVESTMENT STUDIES: This loan will help the Bolivian National Preinvestment Institute (INALPRE) extend credits to Central Government agencies, public enterprises and private enterprises for sectoral and project studies of high priority for the economic and social development of Bolivia. Studies are to be chosen on the basis of selection criteria acceptable to the IDB and will be executed by qualified consultants from the member countries of the IDB.

Borrower: Republic of Bolivia.

Terms: $5.0 million equivalent from the Fund for Special Operations. Term of 25 years at 1 percent interest per annum during the first five years and 2 percent per annum thereafter. Total project cost: $6.4 million equivalent.

Purpose & Benefits: Bolivia is one of the least developed countries in Latin America. Among the obstacles to its development are the existence of a large proportion of the population which does not participate actively in the country's economic life and serious deficiencies in basic transportation infrastructure, communications, energy and other facilities and economic and social services. A shortage of adequately prepared development projects suitable for external financing is also a major limiting factor in achieving Bolivia's development and investment goals. An analysis of potential demand for credit to finance preinvestment studies during the period 1977 to 1980 suggests a total need for about $110 million equivalent, of which $77 million equivalent is in foreign exchange. The proceeds from this IDB loan will be used to help fill this foreign exchange financing requirement.

Date Approved: November 4, 1976 (IDB)

INDUSTRY: The proceeds of this IDB loan will be used to help finance the first phase of constructing an industrial park in the city of Santa Cruz de la Sierra. The IDB will also extend technical cooperation to the Public Works Committee of that city as part of the project. This phase of the project comprises construction of the infrastructure needed to urbanize 234 hectares and the civil construction of 15,000 m^2 of industrial premises plus an administrative headquarters.

Borrower: Republic of Bolivia.

Terms: $6.5 million equivalent from the Fund for Special Operations. Term of 40 years at 1 percent interest per annum during the first ten years and 2 percent interest per annum thereafter. Total project cost: $9.4 million equivalent.

Purpose & Benefits: During the past 20 years the city of Santa Cruz has expanded rapidly, with an average annual population increase of 6.6 percent, to reach 177,000 inhabitants in 1975. In recent years it has become the most important development pole in Bolivia. This phase of rapid growth of the city stemmed from construction of major communication facilities (the highway to Cochabamba and completion of railroad lines to Argentina and Brazil) linking it to the rest of Bolivia and to points abroad, which provide outlets for the region's substantial natural resources (oil, lumber, livestock, cotton and sugar). When the three-phase construction program for the industrial park project has been completed it will cover an area of 1,038 hectares.

Date Approved: November 24, 1976 (IDB)

BRAZIL

AGRICULTURAL RESEARCH: These two IDB loans will help finance a program to support and strengthen agricultural research and associated activities carried out or coordinated by the Empresa Brasileira de Pesquisa Agropecuaria (EMBRAPA—an agency of the Brazilian Ministry of Agriculture) for technology development and transfer designed to raise productivity in the production of various agricultural commodities identified as having priority status in national and sectoral development plans. The program comprises six inter-related sub-projects covering agricultural research, genetic resources, soil surveys and conservation, production of basic needs, agricultural production systems, and manpower training.

Borrower: Federative Republic of Brazil.

Terms: $34.4 million equivalent from Ordinary Capital resources. Term of 20 years at 8.6 percent interest per annum. $32.0 million equivalent in cruzeiros from the Fund for Special Operations. Term of 25 years at 3 percent interest per annum. Total project cost: $131.6 million equivalent.

Purpose & Benefits: Modernization of Brazil's farm sector is planned so as to achieve increased productivity, especially in the South-Central region which produces more than 75 percent of agricultural output but where the possibilities for expansion are limited because all of the suitable land is already being farmed. (Of this region's 2.6 million farm population, about 1.6 million are classified as small-farm holders.) Supply corridors and export corridors are being created for this purpose, with priority areas for each major farm commodity being selected according to ecological conditions and marketing facilities. In addition, incentives are being provided to encourage the use of technical inputs and the national farm credit system is being strengthened. Other incentives being offered include support for the orderly expansion of agrobusiness and marketing systems and incentives for the creation of intermediate producers' organizations—especially producer cooperatives—to engage in marketing and supplying technical inputs. Execution of the program will help Brazil maintain the annual growth rate of almost seven percent recorded in its farm sector since 1970.

Date Approved: November 18, 1976 (IDB)

POWER: The proceeds of this IDB loan will help finance the future expansion of power generation and transmission facilities in the underdeveloped Northeast region of Brazil. The project includes construction of a powerhouse at Sobradinho, expansion of the Boa Esperanca hydroelectric plant, installation of three gas turbine plants, and extension of the region's transmission system. This project is the borrower's Sixth Expansion Plan and is designed to satisfy the projected increase in the demand for electric energy in northeastern Brazil after 1977.

Borrower: Companhia Hidro Electrica do Sao Francisco (CHESF). *Guarantor:* Federative Republic of Brazil.

Terms: $97.7 million equivalent from Inter-Regional Capital resources. Term of 20 years at 8.6 percent interest per annum. Total project cost: $1.1 billion equivalent.

Purpose & Benefits: Brazil depends heavily on external sources for energy supplies—until 1975 it has been estimated that about 60 percent of the country's energy needs were supplied from domestic sources and the remaining 40 percent was covered by imports, mainly of crude oil. Generation and total consumption of energy in Brazil increased from 1971 to 1975 at average yearly rates of 12.1 percent and 12.2 percent respectively. The rate of growth of consumption during the period 1976–1980 is estimated at 12.6 percent. If the present project were not carried out it would be necessary to ration energy in Brazil's Northeast. This would reduce that region's rate of economic development substantially below the levels achieved during the last six years. Studies and designs for the project generating facilities have been prepared and some have been used for awarding construction contracts and procuring major equipment items. The basic designs are available for the transmission component of the project and contracting for construction and assembly of facilities is underway.

Date Approved: December 2, 1976 (IDB)

SCIENCE & TECHNOLOGY: These two loans will help finance development of Brazil's scientific and technological research capabilities. The program, to be undertaken by the Financiadora de Estudos e Projectos (FINEP), consists of two basic components. The first component, estimated to cost about $40 million equivalent, is designed to improve Brazilian capacity to

BRAZIL—Continued

absorb new technologies through the granting of concessional credit (subsidy) to small- or medium-sized industrial or consulting firms for research and development facilities, technical cooperation and training. The second element in the program, to cost an estimated $85 million equivalent, is aimed at strengthening the abilities of selected universities and research centers to carry out research activities related to industrial technology and regional development.

Borrower: Federative Republic of Brazil.

Terms: $40.0 million equivalent from Ordinary Capital Resources. Term of 20 years at 8.6 percent interest per annum. $20.0 million equivalent in cruzeiros from the Fund for Special Operations. Term of 30 years at 3 percent interest per annum. Total project cost: $125.0 million equivalent.

Purpose & Benefits: During the past two decades economists have become increasingly concerned with defining the determinants of economic growth in developing and developed countries. Studies based on macro-economic models reveal that in all cases a large proportion of growth rates cannot be explained by reference to additions of traditional factors of production, such as labor and capital. Parallel to these macro-economic analyses efforts have also been made to evaluate the returns on individual research projects and programs. In such studies, research and development expenditures are treated as investments and the analysis is made of the "returns" attributable to these investments. A recent study of manufacturing research and development in the United States indicated that direct returns to industry from research and development were on the order of about 30 percent and indirect returns amounted to as much as 80 percent. These studies confirm that well defined and directed research and development can contribute significantly to economic and social well-being. The research and development programs in Brazil which these IDB loans will help to support are designed to bring these concrete returns to that country over the longer run.

Date Approved: December 22, 1976 (IDB)

CHILE

AGRICULTURE: The project which this loan will help finance involves the completion of irrigation works in the Digua and Maule Norte regions of central Chile together with a comprehensive agricultural program in these areas to help develop approximately 71,000 hectares for farming to the direct benefit of approximately 2,500 farm families. Among the major components of the project are the following: (a) completion of studies on the waterworks, related infrastructure and the program for resettlement under the Agrarian Law; (b) construction of physical works and infrastructure including the Perquilauquen-Cato Canal, improvement of secondary and tertiary canals, building a feeder line and distribution canals in the Pencahue area, construction of a drainage network and improvement of feeder and service roads; (c) provision of irrigation facilities for land parcels of up to 50 hectares; and (d) agricultural and livestock credit for the purchase of permanent improvements, pastures, cattle and agricultural implements. The loan will also help cover the costs of technical assistance services for farmers and for a program of institution-building for the *Comision Nacional de Riego* (irrigation authority).

Borrower: Republic of Chile.

Terms: $38.0 million from the Fund for Special Operations; 30 years term at 2 percent interest per annum. Total project cost: $62.5 million equivalent.

Purpose & Benefits: Activities under this project and related work to be done by the Government of Chile are to be fully integrated and will result in the completion of the physical plant and provision of the services necessary to permit irrigated cultivation of approximately 94,000 hectares. The IDB-financed portion of the project will, as noted above, specifically cover 71,000 hectares to the benefit of about 2,500 small farmers since eligible beneficiaries for the project will be restricted to those holding up to a maximum of 50 hectares. Seventeen hundred of the beneficiary families will have previously been landless farmers who will have received up to 20 hectares under Chile's Agrarian Reform Program.

The estimated increase in the gross value of agricultural production in the project area after 1980 will be about $36 million equivalent annually, or about triple present output levels in the area. This will stem from a combination of factors, including expansion of the cultivated area under irrigation, increased yields due to the application of modern technology, technical assistance and timely agricultural and livestock credit, increased dairy and beef cattle operations, and the achievement of adequate levels of efficiency in transporting and using water for irrigation purposes. Increased agricultural production is important for Chile, not only as a means of saving foreign exchange now used to import food, but also as a means of improving the diet and increasing rural incomes.

Date Approved: July 29, 1976 (IDB)

INDUSTRY: This IDB Ordinary Capital loan will help finance a program to promote the installation, expansion, renewal and/or improvement of private establishments in Chile's manufacturing industry. The loan will cover the foreign exchange component of this program and will be granted to the Banco Central de Chile which will in turn allot the funds to various intermediary institutions which satisfy the criteria set for participating in the program. The intermediaries will also contribute resources to the overall program and re-lend the program funds to eligible borrowers.

Borrower: Banco Central de Chile.

Terms: $21.0 million equivalent. Term of 20 years with interest at 8.6 percent per annum. Total project cost: $35.0 million equivalent.

Purpose & Benefits: The policy of the Government of Chile regarding development of the manufacturing industry sector dictates that priority be given to financing projects which will generate maximum economic impact and which satisfy one or more of the following criteria: (a) satisfying the needs of a large segment of the national population; (b) engendering high value-added; (c) supplying an export market at competitive international prices; (d) contributing to the creation of new sources of employment; (e) assisting in reconditioning production facilities and in raising productivity; and (f) facilitating the use of the benefits of Latin American and Andean subregional integration efforts. One of the intermediary institutions which will be involved in this program is the Instituto de Financiamiento Cooperativo (IFICOOP), an institution which supports cooperative organizations in Chile.

Date Approved: September 2, 1976 (IDB)

WATER SUPPLY: The health of the poorest segment of Chile's rural population will be enhanced by the potable water program this IDB loan will help finance. These water systems will supply, by the end of the design period in 1996, a population estimated to be about 131,000 persons. The works to be executed consist of integrated systems for impounding, conveying, storing, purifying and distributing water through residential service connections. Most of the systems are to be pump-operated and the primary source is to be groundwater which meets strict requirements as to potability and head. The average supply of water will be 120 liters per person per day for residential service connections.

Borrower: Republic of Chile.

Terms: $7.5 million equivalent from the Fund for Special Operations. Term of 30 years with interest at 2 percent per annum. Total project cost: $12.5 million equivalent.

Purpose & Benefits: Although Chile's general health status falls within the Latin American average, some individual indicators of environmental sanitation, such as rural water supply, place Chile among the most deficient Latin countries. The general infant mortality rate, at 63 deaths per 1,000 live births, is significant. In rural areas the infant mortality rate is worse, mainly because of the incidence of communicable diseases directly associated with the lack of adequate water supply services, contamination of water supplies, and inadequate sewage disposal. The purpose of this project is to extend residential water supply systems to about 87,000 persons, in approximately 150 towns of 200 to 2,000 inhabitants each, located in seven regions of Chile, thereby improving general health standards in the rural areas.

Date Approved: December 22, 1976 (IDB)

COLOMBIA

RURAL DEVELOPMENT: This loan will assist in financing a comprehensive program of rural development in the Departments of Boyaca and Santander. Included among the activities and investments to be undertaken are a series of sub-projects to provide direct support for farming, livestock, fishing and forestry. About 60 percent of program resources will be devoted to these sub-projects through: technological help in generating and transferring know-how and genetic materials to small farmers, credit facilities for use in those sectors, marketing guidance, conservation of renewable natural resources, and community organization and training of personnel for the project and for the small-farmer beneficiaries. There will also be a series of investment projects to furnish physical and social infrastructure such as farm-to-market roads, rural electrification, rural water supply lines, other education investments, and health facilities.

Borrower: Republic of Colombia.

Terms: $64.0 million equivalent from the Fund for Special Operations. Term of 30 years with interest at 2 percent per annum. Total project cost: $109.0 million equivalent.

Purpose & Benefits: The objective of this integrated rural development project is to increase real income and employment opportunities for rural families by raising agricultural productivity and production levels, introducing improved technology supported by technical assistance and institutional credit, and by promoting farm organization, training and development of natural resources. The project will also foster rational linkage of the regional farm economy with markets and reduce inadequacies in basic infrastructure and social services. The direct beneficiaries of the program will be approximately 42,000 farm families whose holdings are between 1 and 20 hectares.

Date Approved: September 23, 1976 (IDB)

SANITATION: This IDB loan is designed to help finance erosion control and sewerage programs in the cities of Manizales, Salamina, Aranzazu, and Bucaramanga. Hydraulic works to be undertaken in Manizales, Salamina and Aranzazu include construction of approximately 17,700 linear meters of interceptors and about 5,900 linear meters of outfalls with inspection wells and about 220 outlet and energy dissipation works, and channel control works with a total length of about 19,100 M. consisting of stone, masonry and concrete structures and channeling works. The Bucaramanga project calls for approximately 18,600 M. of secondary sewers, collectors, outfalls, inspection wells and sumps, 9 outlets and energy dissipation structures, and channel control works of concrete and stone masonry.

Borrower: Republic of Colombia.

Terms: $16.0 million equivalent from the Fund for Special Operations. Term of 30 years at 2 percent interest per annum. Total project cost: $33.0 million equivalent.

Purpose & Benefits: This program is intended primarily to solve erosion problems in Manizales, Salamina and Aranzazu and Bucaramanga. Since the main cause of this erosion is the uncontrolled flow of rainwater and wastewater, 70 percent of the needed corrective investments are to be allocated for construction of hydraulic works directly related to the sewerage systems of the cities involved. Erosion control will help prevent cave-ins and landslides caused by the run-off of rainwater, thereby reducing land loss and reducing the cost of maintenance and repair of the present sewer and aqueduct systems, as well as roads and streets, and generally improving economic and social conditions in the four cities to benefit from this project.

Date Approved: December 2, 1976 (IDB)

TELECOMMUNICATIONS: The rural telecommunications project which this IDB loan will help finance involves the acquisition and installation of equipment for a rural telephone network including radio links, single channel devices, multiple access radio systems, carrier transmission equipment, telephone sets, generators, batteries, cables, wires and related civil construction work. The part of the project to be financed with Colombia's contribution to the financing consists of the design and acquisition and installation of equipment to expand and improve the rural telephone system.

Borrower: Empresa Nacional de Telecomunicaciones de Colombia. *Guarantor:* Republic of Colombia.

Terms: $29.0 million equivalent from the Fund for Special Operations. Term of 30 years at 2 percent interest per annum. Total project cost: $54.8 million equivalent.

Purpose & Benefits: The purpose of this project is to create a basic rural telephone infrastructure to benefit approximately 4.8 million persons, or nearly one-half the rural population of Colombia. This objective is to be accomplished through implementation of the first stage of the Colombian national rural telephony plan which provides for the installation of public telephones in about 2,200 rural communities in 21 Departments of the country. Most of these communities now have poor service (or none at all) connecting them with the nearest towns and the rest of the country. The population to be benefitted under the project has per capita incomes ranging from $50 to $150, while the per capita gross domestic product of Colombia as a whole in 1974 was $450 (U.S. $ equivalents). The project will provide a typical community of some 500 inhabitants with one automatic telephone, installed in a public place and connected to the nearest telephone exchange by means of VHF radio, cable or overhead line. In larger communities two or three phones are to be installed. The telephone service to be provided will help foster Colombia's Integrated Rural Development Program, designed to increase farm production, improve marketing, and provide electricity, roads, and health, water and education services to rural areas.

Date Approved: December 16, 1976 (IDB)

COSTA RICA

SANITATION: This project is designed as the second stage of a program for the expansion and improvement of the San Jose metropolitan area sanitary sewerage system to provide sanitation services to approximately 22,200 houses and 122,000 inhabitants at the end of the construction period and up to 457,000 inhabitants by the end of the design period (year 2000). Enough house connections are to be installed so that at least 80 percent of the houses fronting on sewer lines will receive service.

Borrower: Republic of Costa Rica.

Terms: $15.5 million equivalent from the Fund for Special Operations. Term of 35 years with interest at 2 percent per annum. Total project cost: $22.2 million equivalent.

Purpose & Benefits: This project is an integral part of a broad urban development plan to provide the San Jose metropolitan area with a sanitation infrastructure suited to the needs of a city of approximately one million inhabitants by the year 2000. The urgency of this construction stage is accentuated by the advanced state of work on a current program for expanding water supply in the area. A study of San Jose urbanization patterns during the period 1945 to 1970 points to the advantages of planning all elements of the urban infrastructure (and especially sewerage) on a long-term, rather than a short-term, basis. An indispensable feature of any long-term design is creating excess capacity to accommodate foreseeable changes in service needs and supplemental facilities for various eventualities, within reasonable margins. The structure of the basic elements of this sewerage system was more or less predetermined by the terrain and topography of the service area. In planning secondary and tertiary networks, more stress was given to projections of growth in the neighborhoods, such as those used in urban master development plans (existing and projected transportation facilities, schools, churches and public markets).

Date Approved: July 8, 1976 (IDB)

PREINVESTMENT STUDIES: Costa Rica's Office of National Planning and Economic Policy (OFIPLAN), the administrator of a national Preinvestment Fund, is the executing agency for this project. The loan proceeds will be used by OFIPLAN to extend middle- and long-term credits to finance pre-investment studies for Central Government organizations, independent agencies and private individuals and organizations. The studies to be contracted for will relate to development activities ranked high in order of priority under Costa Rica's National Development Plan. Qualified consultants from eligible member countries of the Bank will be selected to perform these tasks, each being contracted especially for the purpose.

Borrower: Republic of Costa Rica.

Terms: $4.0 million equivalent from the Fund for Special Operations. Term of 30 years with interest at 2 percent per annum. Total project cost: $6.6 million equivalent.

Purpose & Benefits: The Government of Costa Rica has been quite successful in its efforts to reduce social inequalities, provide more and improved public services, and strengthen public sector coordination activity and efficiency in accordance with the National Development Plan. There remain, however, serious deficiencies in the allocation of investment resources which have not always been in conformity with the economic and social objectives of projects financed. In order to remedy certain of these structural weaknesses and make the adjustments necessary to reduce the impact of worldwide inflation, the Government of Costa Rica is reviewing the investment strategies and priorities set forth in the National Plan. As part of this effort, a systematic survey of public sector investment projects is deemed essential.

The IDB resources will assist in financing: (a) specific studies (including technical and economic feasibility studies of programs and specific projects, engineering studies, including plans, specifications and the final design of projects that have been shown to be technically and economically feasible), and (b) general studies (including basic regional, sectoral or subsectoral studies of watersheds, natural and human resources, aerophotographic surveys and others).

The potential demand for credit for preinvestment studies in Costa Rica during the 1976–80 period is estimated at more than $90 million ($80 million public sector and $10 million private sector). These studies, in turn, are expected to lead to development projects requiring total investment of approximately $3.1 billion, of which more than $1.7 billion would be in the private sector and $1.4 billion in the public sector (dollar equivalents).

Date Approved: December 2, 1976 (IDB)

EDUCATION: The proceeds of this loan will help finance the establishment of a student loan fund to extend approximately 1,700 loans to university-level students concentrating in priority subjects vital to the development of the Costa Rican skilled manpower pool. About 1,520 loans will be made to undergraduates studying in Costa Rica and 180 loans will be for Costa Rican graduate students in other IDB member countries. The resources of the loan fund are to be committed over a three-year period and disbursed within four years from the effective date of the student loan contract. The student loans would be restricted to individuals whose gross family annual income does not exceed $6,600 equivalent, for those studying in Costa Rica, or $9,000 equivalent for those studying abroad. Students whose gross annual family income does not exceed $3,100 equivalent will be eligible for 100 percent of the amount to be financed; those with annual family incomes between $3,100 and $9,000 (equivalents) will be eligible for an amount of credit proportional to the income of the family and the number of its dependent members.

Borrower: Republic of Costa Rica.

Terms: $4.8 million from the Fund for Special Operations. Term of 35 years at 2 percent interest per annum. Total project cost: $7.4 million equivalent.

Purpose & Benefits: The student loan scheme is an integral part of Costa Rica's national economic and social development program. One objective of this program is to train human resources to meet qualitative and quantitative needs of the country. The size of this effort is reflected in the high percentage of the national budget devoted to education (33.1 percent in 1975) and in the social emphasis which seeks to provide educational opportunities to qualified students from low-income rural areas who might otherwise find it difficult to pursue studies at the university level. It is estimated that nearly 20,000 students will be potential applicants for educational loans by 1980. With the aim of extending decisive support in this area, the National Student Loan Fund (CONAPE) was established by law to channel resources into financing university studies. CONAPE's mandate also includes conducting surveys of medium- and long-range manpower needs based on the guidelines and priorities set forth in the national development plans.

Date Approved: January 19, 1977 (IDB)

POWER: This project comprises the second stage of a series of studies designed to determine the feasibility of commercial development of geothermal resources for the production of electric energy in Costa Rica. Preliminary surveys demonstrate the advisability of continuing this second stage of studies, which will consist of exploratory drillings to evaluate geothermal potential and to prepare the final report on the feasibility of a first generating plant (including the data and analysis needed for a likely loan application to an international credit agency).

Borrower: Republic of Costa Rica.

Terms: $4.1 million equivalent from the Fund for Special Operations. Terms of 30 years with interest at 2 percent per annum. Total project cost: $5.3 million.

Purpose & Benefits: The program for expanding electric energy production in Costa Rica contained in the National Electrification Plan calls for increasing installed generating capacity from about 354 MW. at the end of 1976 to 792 MW. by 1984. This is expected to entail total investments equivalent to US$1.7 billion in new plants serving the National Interconnected Service. New facilities include the El Arenal hydroelectric project (partly financed by the IDB), and the proposed geothermal plant to be built if the results of this second stage of studies are, as anticipated, favorable.

Date Approved: May 19, 1977 (IDB)

AGRICULTURAL CREDIT: Based on Credit Regulations to be put into force prior to first disbursements under this IDB loan, the Banco Nacional de Costa Rica will extend credit to small agricultural and livestock producers and to cooperatives or similar farmer entities for the purpose of financing fixed investment (permanent structures and crops), for purchasing cattle for breeding purposes, and for procuring machinery and equipment.

Borrower: Banco Nacional de Costa Rica. *Guarantor:* Republic of Costa Rica.

Terms: $10.0 million equivalent from the Fund for Special Operations. Term of 20 years with interest at 2 percent per annum. Total project cost: $14.4 million equivalent.

Purpose & Benefits: This farm credit program will be dedicated primarily to stimulating the production of basic grains (rice, corn, and beans), milk, and pork, together with some increase in beef and sugar cane, plus other agriculture and livestock products not expressly excluded by the Bank, should market conditions make their inclusion advisable. Although citrus fruits will be eligible under the credit program, no significant amount of resources is expected to be devoted to this sector. The program is effectively geared to financing agricultural and livestock products which are already established and are being produced in Costa Rica. With regard to some items, such as beef cattle, Costa Rica has in fact become known as a top quality producer. The technical assistance to be offered under the program will help achieve greater degrees of specialization in chosen fields of activity. Included in the items eligible for financing is the establishment or improvement of forest areas. The mountainous character of much of Costa Rica makes it desirable to foster such investments to prevent erosion. Furthermore, the availability of forestry products has dropped significantly and has led to substantial increases in the prices of such articles as the posts that support electric wiring (domestic production of which would compete advantageously with comparable imported products). Approximately 1,000 individual producers and members of cooperatives are expected to benefit from this loan.

Date Approved: May 24, 1977 (IDB)

DOMINICAN REPUBLIC

EDUCATION: This IDB loan to the Universidad Catolica Madre y Maestra (UCMM) will help finance the second stage of the University's development plan. The plan envisages, in the health field, introduction of innovative teaching methods in training health professionals, research workers, teachers and technicians. In the fields of engineering and technology the program involves consolidation of the program for training intermediate personnel with a concentration in engineering to meet the demand for professionals in the context of the Dominican Republic's national industrial and economic development schemes. In the research field, the

IDB loan will help support the scientific research program, the findings of which are to be used in the definition and selection of problems, the incorporation of new technologies and the promotion of industrial development.

Borrower: Universidad Catolica Madre y Maestra. *Guarantor:* Dominican Republic.

Terms: $3.9 million equivalent from the Fund for Special Operations. Term of 40 years with interest at 1 percent per annum during the first 10 years and 2 percent per annum thereafter. Total project cost: $5.65 million equivalent.

Purpose & Benefits: The UCMM health sciences program is designed to develop professionals for the exercise of integral preventive, curative and rehabilitative medicine adopted to meeting the country's health problems. Traditional medical training in the Dominican Republic has been characterized by the lack of coordination between theory and practice, owing to the absence of adequate motivation, emphasis on individual curative activities and the neglect of prevention and inadequate team training. The UCMM programs will also help foster regional development by training intermediate professionals to meet the growing demand generated by national industrial and economic development, and by expanding the University's services as an agency of technological innovation and encouraging ties between its faculty and various sectors and organizations in the Dominican Republic.

Date Approved: October 28, 1976 (IDB)

AGRICULTURE: This loan will help finance the second stage of the Integrated Agriculture and Livestock Development Program (PIDAGRO). (The IDB had previously helped finance the first stage of this program with a $24 million equivalent loan approved in late 1972.) The principal objectives of the PIDAGRO program are to: (a) increase agricultural and livestock production for food purposes, (b) improve agricultural and livestock productivity levels, (c) contribute to improved use of natural resources, (d) promote strengthening of the institutions interested in agricultural and livestock production, and (e) coordinate policies and programs in the agriculture and livestock sectors.

Borrower: The Dominican Republic.

Terms: $19.5 million equivalent from the Fund for Special Operations. Term of 40 years with 1 percent interest per annum for the first 10 years and 2 percent thereafter. Total project cost: $27.5 million equivalent.

Purpose & Benefits: During the period 1969–1974 the gross domestic product (GDP) of the Dominican Republic increased by about 9 percent per annum. In 1975, however, the rate of growth dropped to around 6 percent, largely as a consequence of drought, a reduction in industrial production caused by energy shortages, a decline in construction, and the decrease in the vitality of the export sector (with the exception of sugar). In 1975 the large increases in the price of sugar were not adequate to offset the impact of declines in the productivity of other sectors. The scarcity of agricultural and livestock credit is one of the most inhibiting aspects of agricultural development in the Dominican Republic and a large share of such financing continues to be from public sources. Although playing an increasing role, the commercial banking system has only a small share within the total sector financing. In 1971 agricultural and livestock credit extended by the commercial banking system amounted to only 6 percent of its total portfolio. This rose to only 8 percent in 1975. This IDB loan should help further to meet demand for this type of credit. When this phase of the PIDAGRO program has been completed it is expected that per capita income of farm workers in the area will have doubled (from the current $620 per year to $1,300 per year, equivalents) and the Dominican Republic's dependence on food imports will have declined through higher domestic production of basic foods such as milk, meat and rice.

Date Approved: December 22, 1976 (IDB)

ECUADOR

AGRICULTURAL RESEARCH: The proceeds of this loan are to be used to strengthen and expand the technical and operating capabilities of the Instituto Nacional de Investigaciones Agropecuarias (INIAP). This will intensify ongoing research on cereals, livestock, and vegetable oils. In addition, new research programs are to be initiated on fruit and vegetables, poultry, and leguminous grains. INIAP—Ecuador's national agricultural research institute—will also increase experimentation in such support fields as entomology, phytopathology and weed control. New skills and additional personnel will be added to the INIAP staff to fulfill these expanded research tasks and a technology transfer mechanism will be introduced to insure that the results of INIAP's research is available to, and adopted by, Ecuadorean agriculturalists.

Borrower: Instituto Nacional de Investigaciones Agropecuarias. *Guarantor:* Republic of Ecuador.

Terms: $11.0 million equivalent from the Fund for Special Operations. Term of 40 years at 1 percent interest per annum for the first 10 years and 2 percent per annum thereafter. Total project cost: $16.9 million equivalent.

Purpose & Benefits: INIAP's research activities will increase substantially as a result of this project. More than 4,000 additional experiments are to be performed during the project execution period and, by the end of that period, INIAP will have more than tripled its annual experimentation capacity, as compared with 1976. The project is expected to develop a functioning technology transfer mechanism using approximately 40 production specialists who are to carry out experiments at the farm level. This applied research program will be initiated in four different areas of Ecuador and will emphasize wheat, corn, rice, or dairy cattle, as appropriate to the area.

Date Approved: November 18, 1976 (IDB)

POWER: This IDB financing will help finance the third phase of a four-phase project entailing construction of Ecuador's National Interconnected System, designed to link all of Ecuador's major power generation facilities with the country's primary power consumption centers. This phase is denominated the "Paute Transmission System" and comprises the transmission facilities required to deliver power generated by the Paute Hydroelectric Project to the national grid. The main trunk lines of this grid will be the same Paute Transmission System facilities.

Borrower: Republic of Ecuador.

Terms: $25.0 million equivalent from Ordinary Capital resources. Term of 20 years with interest at 8.6 percent per annum. $1.6 million equivalent from the Fund for Special Operations. Term of 20 years at 1 percent interest per annum during the first 5 years and 2 percent per annum thereafter. Total project cost: $100.6 million equivalent.

Purpose & Benefits: Power consumption in Ecuador rose 235 percent during the period 1966–1974, from 608 Gwh. to 1,430 Gwh. Installed generating capacity has grown 240 percent during the past ten years. Despite this, Ecuador has one of the lowest per capita power production rates in Latin America, at 220 Kwh. (This ratio for Latin America as a whole is 640 Kwh.) Current plans for the Ecuadorean power sector call for power production to be approximately tripled by 1987, to 540 Kwh. per capita per year, with service being provided to 67 percent of the population by that year. During the 1976–1985 period it is estimated that the demand for power will grow by 12.4 percent annually. To meet these needs, an ambitious investment program is underway to exploit Ecuador's hydroelectric resources and to distribute this power through the National Interconnected System. Nine regional systems throughout the country would be responsible for the actual marketing of this energy.

Date Approved: December 9, 1976 (IDB)

TRANSPORTATION: The proceeds from these IDB operations will help finance two oil and gas pipelines as part of Ecuador's efforts to achieve a rational supply of oil byproducts, transporting these from production centers to major consumer centers. The pipelines should also make possible the exploitation of currently unused gas resources and the replacement of imports. The project involves construction of pipelines from Esmeraldas to Quito and from Shushufindi to Quito and for pumping and storage installations. The Esmeraldas-Quito pipeline (259 kilometers long with a capacity of 58,350 BPD) will transport oil byproducts processed at the refinery under construction at Esmeraldas. Distribution of byproducts is to be supplemented by the use of an existing pipeline between Quito and Duran and by highway transportation facilities. The Shushufindi-Quito pipeline (300 kilometers long with a capacity of 6,418 BPD) will carry liquefied gas and natural gasoline to Quito.

Borrower: Corporacion Estatal Petrolera Ecuatoriana (CEPE). *Guarantor:* Republic of Ecuador.

Terms: $20.0 million equivalent from Ordinary Capital Resources. Term of 15 years at 8.6 percent interest per annum. $16.0 million equivalent in a complementary line of credit (Ordinary Capital). Total project cost: $81.2 million equivalent.

Purpose & Benefits: In 1975 Ecuador produced 160,996 BPD of crude oil and production is expected to reach 220,000 BPD in 1977, increasing thereafter to a level of 327,000 BPD by 1980. Of current crude oil production, 83 percent is exported and almost all is derived from the fields operated by the CEPE-Texaco/Gulf consortium. Ecuador plans to exploit its gas reserves and the first of its development plans will be carried out beginning with construction of a gas recovery and liquefication plant at Shushufindi with an LPG production capacity of 345 tons a day. This should make it possible to replace imports, which now supply about 90 percent of domestic gas consumption and to generate (decreasing) exportable surpluses up to the year 1984. Shushufindi gas reserves are sufficient to maintain that plant in operation for more than its estimated useful life, estimated at 20 years.

Date Approved: December 10, 1976 (IDB)

EL SALVADOR

ROADS: The project this loan will help finance is part of the first phase of a national rural road construction program included in El Salvador's National Development Plan as a means of improving living conditions among the rural poor. The project involves construction of about 210 km. of new one-lane rural roads in various regions of the country. Seventeen roads have been preselected, on a preliminary basis, from among which the final choice of roads in the program is to be made. In keeping with current IDB policies, the Direccion General de Caminos (the executing agency) made final designs and economic feasibility studies for a representative sample of these roads.

Borrower: Republic of El Salvador.

Terms: $10.0 million equivalent from the Fund for Special Operations. Term of 40 years with 1 percent interest per annum during the first 10 years and 2 percent thereafter. Total project cost: $15.3 million equivalent.

Purpose & Benefits: The purpose of this program is to integrate new or neglected agricultural production areas into El Salvador's mainstream of economic development. In general, the service areas of the project roads have at least some basic socio-economic infrastructure facilities and there are plans for expanding these facilities. The roads to be built thus are one component in a cohesive rural improvement plan. Existing infrastructure includes 100 schools of various types, 8 health service units, 10 water supply systems and warehouses for storing substantial amounts of agricultural produce. In many cases, the most important benefit for the rural population to be served by these roads will be the establishment of regular bus service to larger population and market centers. The program is to benefit the poorest of the rural areas and, particularly, those regions where the average annual family income is estimated to be less than $600 equivalent.

Date Approved: August 5, 1976 (IDB)

FISHERIES: This project includes the establishment of a line of credit for offshore fishermen's cooperatives, small fish merchants, fish farmers, and other beneficiaries. These credit resources are to be used to help finance the purchase of fishing vessels and equipment, construct buildings, equip installations and acquire distribution and sale facilities. The project also entails the construction of unloading facilities at Acajutla, El Triunfo and El Tamarindo, the remodeling of an existing installation at La Union, provision of landside equipment and facilities for the existing wharf at La Libertad, and similar work involving facilities for the El Salvador fishing industry.

Borrower: Republic of El Salvador.

Terms: $5.3 million equivalent from the Fund for Special Operations. Term of 40 years with interest at 1 percent for the first ten years and 2 percent per annum thereafter. Total project cost: $6.7 million equivalent.

El Salvador—Continued

Purpose and Benefits: The principal objective of this project is to increase local fish output and consumption through entrepreneurial improvements for small off-shore fishermen grouped into cooperatives (supplying specialized technical support and providing wharves and modern implements for the catch, processing and marketing of fish). Fish farmers are to be helped through the construction of ponds for intensive inland fishing on approximately 100 hectares of marginal lands in various regions of the country and appropriate distribution and sales facilities for small retailers will also be provided.

Date Approved: February 3, 1977 (IDB)

WATER SUPPLY: The major objective of the program this loan will help finance is to provide potable water supplies to a population of 100,000 in approximately 125 towns which currently lack that service. Localities selected are to have from 300 to 2,000 inhabitants each. Execution of this program will help reduce high water-borne disease rates and high infant mortality, improve general rural health and hygiene conditions, encourage installation of sanitary appliances in housing units and introduce community improvement programs.

Borrower: Republic of El Salvador.

Terms: $4.7 million equivalent from the Fund for Special Operations. Term of 40 years with interest at 1 percent during the first ten years and 2 percent thereafter. Total project cost: $7.3 million equivalent.

Purpose & Benefits: It is estimated that as of the end of 1975 only 28 percent (approximately 692,000) of El Salvador's total rural population of 2,472,000 inhabitants had access to suitable water supplies. Of these, 48,000, or 2 percent of the rural population, were receiving this basic service through household connections. The rest of the population then served had access to public water taps only, providing water which was often of poor quality and deficient in volume. Through execution of this program it is expected that another 100,000 rural inhabitants will receive water service, three-quarters of which will be provided through household connections. Achieving this goal would raise the percentage of rural population served by house connections to about 5.4 percent of total rural population.

Date Approved: March 24, 1977 (IDB)

GUATEMALA

ROADS: This highway reconstruction and improvement loan will help repair roads severely damaged by the February 1976 earthquake, finance the building of new local roads including those for which resources earlier made available were re-assigned to the reconstruction of the Atlantic route which had been damaged by the earthquake, and other roads to link rural highland communities with the rest of Guatemala. Approximately 180.0 kilometers of highways and roads will be involved in this project.

Borrower: Republic of Guatemala.

Terms: $25.0 million equivalent from the Fund for Special Operations. Term of 40 years with interest at 1 percent during the first ten years and 2 percent annually thereafter. Total project cost: $33.6 million equivalent.

Purpose & Benefits: The Guatemalan highway system was seriously disrupted by the 1976 earthquake with severe damage to arterial highways CA–9 North (Atlantic route), CA–9 South (Pacific route), CA–1 West (Highlands route) and national highways Nos. 1, 10 and 15. Route CA–9 North to the Atlantic links Guatemala City with Puerto Barrios and Santo Tomas de Castilla—Guatemala's most important port and harbor complex. Among the road programs being reformulated in this context is Local Roads Program II, financed in part with a previous IDB loan. The number of roads in this program will be reduced to four and the program will also include reconstruction of highway CA–9 North. The roads stricken from that program form part of this new project program. An IDB special mission which visited Guatemala in February 1976 after the earthquake and a later special mission to Guatemala in July 1976 verified the choice of projects to be included in this new Bank project.

Date Approved: January 19, 1977 (IDB)

HAITI

IRRIGATION: This loan will help finance the first stage of a comprehensive program to promote development of the Artibonite Valley through the completion and rehabilitation of the Valley's irrigation system, introduction of appropriate cultivation techniques, provision of credit and technical assistance to farmers and institutional strengthening of the Organization for the Development of the Valley of the Artibonite (ODVA). Five specific subprojects are to be financed: (a) infrastructure works, (b) land preparation, (c) agricultural extension services, (d) supervised agricultural credit, and (e) a rural cadastral survey.

Borrower: Banque Nationale de la Republique d'Haiti. *Guarantor:* Republic of Haiti.

Terms: $5.0 million equivalent from the Fund for Special Operations. Term of 40 years at 1 percent interest per annum for the first 10 years and 2 percent per annum thereafter. Total project cost: $5.9 million equivalent.

Purpose & Benefits: The Artibonite Valley is Haiti's rice bowl, containing about 90 percent of the irrigated land devoted to the production of rice which is an important staple of the Haitian diet. The principal benefit of the project is an expected increase in average per hectare yield of rice from 2,000 kilograms to 2,500 kilograms, stemming from an improved irrigation system which will permit the application of fertilizer, better seeds and improved cultivation practices. The incremental production of rice on the 3,600 hectares covered by this rehabilitation project will be about 10,800 metric tons of unmilled rice annually—equal to 13 percent of Haiti's yearly rice production in recent years. Extension of similar cultivation practices to the rest of the irrigated land in the Valley could double Haiti's rice production within the next ten years.

Although expanded rice production is the immediate primary objective of the program, natural conditions in the Valley, combined with better water control and regulation through the rehabilitated irrigation system, should make it feasible later to increase production of fruit, vegetable, and other commercial crops (some of which are now grown on a small scale). The increase in the annual gross cash income of farmers benefiting from this project has been estimated at more than $600 equivalent, or more than 70 percent higher than present incomes. These higher incomes should cover added production costs such as irrigation charges, new agricultural inputs (fertilizers, pesticides) and additional labor and provide a surplus to cover household expenses, increase food consumption and raise the farmer's standard of living.

Date Approved: August 5, 1976 (IDB)

HONDURAS

WATER SUPPLY: This loan will help improve and expand the water supply systems in the cities of La Ceiba, Puerto Cortes and El Progreso. At La Ceiba the project includes construction of intake facilities on the Danto River, building the first stage of a treatment plant, and the installation of approximately 8.5 kilometers of main pipe, 65 kilometers of distribution line, and approximately 3,100 metered house connections. At Puerto Cortes, intake facilities will also be built as will the first stage of a treatment plant. Raised reservoirs are to be constructed and supply main and distribution line put in place. Approximately 760 metered house connections are also in the Puerto Cortes project, together with approximately 3,400 meters for existing connections. At El Progreso, two new wells will be drilled, new reservoirs built, two pumping stations installed and distribution lines and house connections executed.

Borrower: Republic of Honduras.

Terms: $12.0 million equivalent from the Fund for Special Operations. Term of 40 years at 1 percent interest per annum during the first 10 years and 2 percent per annum thereafter. Total project cost: $15.0 million equivalent.

Purpose & Benefits: These projects are part of the Honduran National Development Plan effort to provide La Ceiba, Puerto Cortes and El Progreso with water supply services adequate to meet the basic needs of these cities up to the year 1990. Hurricane Fifi severely damaged the social and economic infrastructure of Honduras: river floods destroyed virtually all of the water intake facilities for these three cities and left only a portion of the water supply lines in usable condition. The cities involved are important satellite towns in the Sula Valley, considered to be one of Honduras' major economic development poles. By supplying potable water, the project will furnish a preventive health service of first priority because of high mortality rates from infectious and parasitic diseases in the project region.

Date Approved: September 30, 1976 (IDB)

AGRICULTURE: This IDB loan will help finance an integrated agricultural development project in the Lower Aguan River Valley. Among the principal complementary and interrelated activities are the production of African palm to meet shortages of domestically produced edible oils in Honduras, citrus growing, mostly for export to European markets, and the production of basic grains, fruit, tubers and garden vegetables and annual crops to cover domestic demand in Honduras. Other portions of the projects include credit extension, support services, highway infrastructures, land improvement, and social infrastructure.

Borrower: Republic of Honduras.

Terms: $40.0 million equivalent from the Fund for Special Operations. Term of 40 years at 1 percent interest per annum during the first 10 years and 2 percent interest per annum thereafter. Total project cost: $51.5 million equivalent.

Purpose & Benefits: The purpose of this project is to expand and consolidate development in the Aguan River Valley, largely to the benefit of low-income producers organized into production cooperatives. The project is also designed to stimulate the flow of farmers to the Aguan Valley where productive land currently lies underutilized. Specific objectives of the project include the consolidation of about 3,200 families settled under a cooperative system in the first stage of the project and the settlement of another 3,000 farm families, also in cooperatives. This should help create the economic basis for the multiplication of agricultural and agroindustrial development poles needed in Honduras. The project also aims to reorganize and strengthen existing cooperatives and create others, up to a total of 70, so as to generate greater benefits to the region as a whole. The internal economic rate of return of this program is calculated to be about 21 percent. In addition to the direct economic benefits to be achieved through the project, agriculture and livestock production practices will also be improved and family income in this rural area increased to reach an average of $2,000 (equivalent) in the year of full development of the farms, compared to a current average estimated at $300 (equivalent). The design of the cooperative production unit of about 500 ha. will permit considerable economies of scale, the intensive use of high-quality soils and the more productive and continuous employment of the families benefited. Increased employment is estimated at the equivalent of 7,440 workers (1.2 jobs per family) and new job opportunities are to be created in the agroindustrial installations needed to process and market the African palm and citrus crops.

Date Approved: November 4, 1976 (IDB)

EDUCATION: This IDB loan will help finance the establishment of a student loan fund in Honduras to assist the training of students at the university and post-graduate levels in priority economic development skills. About 295 loans will be granted for technical and undergraduate studies in Honduras and about 220 loans will be to students for post-graduate studies in IDB member countries. The loans, to be granted chiefly to students from modest or low income families will cover the costs of studies, housing, food, transportation, books and such other costs as the student may incur, depending on the nature of the studies pursued and the student's particular socio-economic circumstances.

Borrower: Republic of Honduras.

Terms: $3.0 million equivalent from the Fund for Special Operations. Term of 40 years at 1 percent interest per annum during the first 10 years and 2 percent per annum thereafter. Total project cost: $3.7 million equivalent.

Purpose & Benefits: This Student Loan Program is an integral element in the Honduran National Development Plans. It is directed basically to promoting the economic and social development of Honduras. Efforts to meet demands for technicians and college-trained professionals are being made through a variety of education and training programs, with special emphasis on providing facilities for students from rural areas who

INTER-AMERICAN DEVELOPMENT BANK—Continued

HONDURAS—Continued

are financially less well off and often do not have equal education opportunities. Within this context, the Student Loan Program is designed to satisfy rising student demand for loans—estimated at not less than 3,000 potential applicants during each year of the program. The Instituto de Credito Educativo is to provide guidance and placement services to beneficiaries of the loans in order to guarantee their academic success as well as adequate coordination between deficit employment sectors and the supply of technicians and professionals. Analyses are also to be made of human resource requirements under the Honduran development plans to identify priority areas for training and optimum use of available loan funds.

Date Approved: December 2, 1976 (IDB)

ROADS: The overall program for the industrial development of the Olancho Forest Reserve consists of two basic components: an industrial subproject and an infrastructure facilities subproject. This IDB loan will provide funding only for the road portion of the infrastructure subproject, specifically, the Bonito-Puerto Castilla Highway, the Bonito-El Carbon-San Esteban Highway, the La Union Pueblo Viejo-Mame Highway, a number of secondary highways to be built during the second stage, with bearing and scheduling depending on the forest resources inventory and on the logging plant now under study; and later, the principal highway southward.

Borrower: Republic of Honduras.

Terms: $59.5 million equivalent from the Fund for Special Operations. Term of 40 years at 1 percent interest per annum during the first 10 years and 2 percent per annum thereafter. Total project cost: $74.3 million equivalent.

Purpose & Benefits: The Honduran Government places high priority on the Olancho forest industry project for the development of Honduras in accordance with its 1975–1979 National Development Plan. Exploitation of the vast Olancho forest reserves through the creation of industrial complexes will also help bring into the national economic mainstream adjacent areas of high agribusiness potential affording opportunities for mass employment and improved living conditions for the rural population. The Olancho project will contribute effectively to achieving national economic stability by providing for sustained growth at higher rates. The project constitutes, together with the Aguan Integrated Agricultural Project, a major basis for a regional development pole in Olancho consistent with the concept of reorganizing and rationalizing Honduran economic space.

Date Approved: December 16, 1976 (IDB)

JAMAICA

INDUSTRIAL CREDIT: The borrower and executing agency for this loan is the Jamaica Development Bank, an autonomous public corporation created in 1969. The Jamaica Development Bank's principal objectives are to: (a) foster, promote and assist the financing of capital investment in Jamaican enterprises; (b) foster the development of Jamaica's money and capital markets; and (c) place, acquire and/or guarantee issues of stocks, bonds and other securities.

Borrower: Jamaica Development Bank (JDB). *Guarantor:* Jamaica.

Terms: $8.0 million equivalent from Inter-Regional Capital resources; 20 years term at 8.6 percent interest per annum. Total project cost: $12.0 million equivalent.

Purpose & Benefits: This is the IDB's fourth loan in support of the JDB Credit program designed to foster the establishment, expansion, renewal and/or improvement of medium-scale enterprises in the Jamaican manufacturing sector. The objective of the program is to help finance economically viable projects which help expand exports, substitute for imports, generate employment, use local materials, foster regional trade, improve linkages among Jamaican enterprises, and enhance local participation in the ownership of industry. The IDB loan will finance about two-thirds of the cost of the third phase of this JDB program. It is estimated that this phase of the program will create about 900 new jobs in Jamaica and lead to an increase of Jamaican industrial production on the order of $4.8 million equivalent.

Date Approved: September 16, 1976 (IDB)

PREINVESTMENT STUDIES: This loan will help finance a program to improve Jamaica's institutional capabilities to plan and prepare studies and select and evaluate the consequent development projects. The loan (and associated technical assistance) will also seek to accomplish a number of operational objectives: (a) facilitate an increase in the number, and improve the quality of, projects which can attract domestic and external financing, (b) help shorten the project cycle by preparing technically, economically and financially feasible projects, including, where appropriate, preliminary or final engineering studies and designs, (c) help ensure that studies are based on the best available appropriate technology and meet the requirements of domestic and external financing agencies, (d) facilitate participation by local consulting firms and professionals in the preparation of preinvestment studies and development projects, and (e) provide opportunities for the private sector to participate in preinvestment programs.

Borrower: Government of Jamaica.

Terms: $2.6 million equivalent from the Fund for Special Operations. Term of 25 years at 2 percent interest per annum. Total project cost: $4.8 million equivalent.

Purpose & Benefits: A large proportion of the Jamaican labor force is unemployed, notwithstanding the high rates of growth experienced by the economy during the decades of the 1960's. Social and economic inequality in Jamaican society has, furthermore, increased because this growth has been concentrated in a few sectors. To correct these trends, the Jamaican Government embarked on a development strategy in the early 1970's centered on employment generation, labor productivity, and the relief of critical bottlenecks. Implementation of this strategy has increased public sector participation in the Jamaican economy, as witnessed by the ratio of public expenditure to Gross Domestic Product (23 percent in 1971 and 36 percent in 1975). The increasing role of Jamaica's public sector in the economy, the greater volume of investment generated, and the need for adequately prepared studies to support investment projects justify the scope and timing of this program. In addition, the mechanism for funding preinvestment studies supports Jamaican Government efforts (as well as those of international and bilateral assistance agencies) to improve the efficiency of development project preparation.

Date Approved: December 16, 1976 (IDB)

MEXICO

EDUCATION: This loan will help finance fellowship loans for studies at the master's or doctor's level or in special graduate courses in Mexico and abroad in the following specific academic areas: exact and natural sciences, engineering, agriculture and livestock sciences, and socio-economic sciences. The conditions governing the granting of these fellowships will be similar to those in the 1976 Internal Fellowship Regulations of the Mexican Consejo Nacional de Crencia y Tecnologia (CONACYT), a public agency which advises the Mexican Government on scientific and technological policies.

Borrower: Nacional Financiera S.A. *Guarantor:* United States of Mexico.

Terms: $20.0 million equivalent from Ordinary Capital resources. Term of 20 years at 8.35 percent per annum. Total project cost: $44.4 million equivalent.

Purpose & Benefits: This project is designed to train high-level human resources as a means of strengthening Mexico's science and technology infrastructure in priority development fields. The proceeds from the loan will be used exclusively for granting fellowships. Mexico does not now have an adequate system for developing and adapting technology to needs at the national level. Since 1970 it has become increasingly apparent that there is an inadequate number of research workers available and the Mexican Government has been developing a dynamic policy for high-level manpower training. According to studies conducted by CONACYT, Mexico's scientific and technological system will require approximately 35,000 scientists and technicians by 1982.

Date Approved: January 19, 1977 (IDB)

AGRICULTURE: This project will involve a wide variety of rural water resource development activities. Major components are: (a) studies for tapping subterranean and surface water; (b) construction of small facilities each for irrigating up to 2,500 ha. of land with surface or subterranean water, including the expansion of works to introduce irrigation on new areas, the rehabilitation of other works, and works for watering livestock; (c) advance operations comprising minor works in land parcels, clearing and leveling, the operation of demonstration parcels, and technical and advisory services; and (d) the acquisition of necessary machinery and equipment.

Borrower: Nacional Financiera S.A. *Guarantor:* United States of Mexico.

Terms: $54.0 million equivalent Ordinary Capital loan. Term of 20 years with interest at 8.35 percent per annum. Total project cost: $129.7 million equivalent.

Purpose & Benefits: This project is part of the Fourth Stage of Mexico's National Plan of Hydraulic Works for Rural Development and is designed to bring about 19,000 low-income *campesino* families into the monetary economy through the construction, expansion and/or rehabilitation of approximately 500 hydraulic works throughout the country. These activities will permit irrigation of approximately 60,000 ha. of land, as well as provide water for livestock. The basic crops to benefit are primarily of corn, wheat and beans for human consumption and sorghum for animal feed. Projections of the output, based on the assumption that approximately 70 percent of the project area is to be sown with those crops, foresee total output of from 120,000 to 150,000 tons of grains which, given import levels in recent years, implies that less than 5 percent of domestic demand will remain uncovered by national production. The economic rate of return is projected to exceed 10 percent.

Date Approved: January 27, 1977 (IDB)

PREINVESTMENT: This loan will help finance the Third Stage of a Preinvestment Studies Program to be carried out by the Mexican Fondo Nacional de Estudios de Preinversion. This program finances technical, economic and financial feasibility studies of specific public and private sector development projects as well as sectoral and regional development studies. The resources will be used to make sub-loans to execute studies of projects sponsored by public and private entities in Mexico and will be conducted by expert consultants and consulting firms.

Borrower: Nacional Financiera S.A. *Guarantor:* United States of Mexico.

Terms: $5.0 million equivalent from Ordinary Capital resources. Term of 20 years with interest at 8.35 percent per annum. $10.0 million equivalent in Mexican pesos from the Fund for Special Operations. Term of 20 years with interest at 4 percent per annum. Total project cost: $25.0 million equivalent.

Purpose & Benefits: Gross fixed investment in Mexico, which had been maintained at comparatively high levels of real growth until 1974, fell sharply in 1975 and 1976, primarily because of sluggish private investment. The real growth rate of total investment, which had been 12.4 percent in 1972, 4.1 percent in 1973 and 12.1 percent in 1974, fell to 1.8 percent in 1975 and, according to preliminary estimates, recorded a real decline of about 1 percent in 1976. A sustained investment effort will be required for Mexico to continue to expand GDP at an annual rate of 4 percent. This will be possible only through increased internal savings, since a smaller proportion of total investment will have to be financed by external savings in order to hold the current account deficit of the balance of payments to manageable levels. This objective can be achieved to the extent Government decisions to rationalize public expenditures and increase current revenues are effectively implemented, and to the extent that economic and financial stabilization programs are successful in curtailing inflation. These factors will help promote private savings and investment and increase public savings in Mexico.

Date Approved: May 19, 1977 (IDB)

NICARAGUA

WATER SUPPLY AND SEWERAGE: This IDB loan will help finance water supply and sewerage system construction in several Nicaraguan cities and towns. In the water supply systems to be built, distribution networks are to be expanded and service connections installed. Deep wells will also be drilled, pumping and chlorination equipment installed, new conduction pipe laid and storage tanks built where needed. In the two sewerage systems to be constructed, collector networks are to be installed, pumping stations built, pressure pipe laid, service connections installed, an oxidation pond built, and an outfall built for discharge into the sea.

Borrower: Republic of Nicaragua.

Terms: $16.8 million equivalent from the Fund for Special Operations. Term of 40 years at 1 percent interest per annum during the first 10 years and 2 percent per annum thereafter. Total project cost: $23.8 million equivalent.

Purpose & Benefits: The objectives of this program are to: supply potable water, through expansion and improvement of the water supply systems in four cities, to an estimated population of 28,700 in 1976 and 98,800 by the year 2000 and to provide sewerage service in two cities to a population now lacking such service and projected to be serving a population of 46,150 in the year 2000. The program will also supply potable water to some 47 communities (with a population of 107,500 in 1976 and an estimated 340,000 by the year 2000). An office building for the Departmento Nacional de Acueductos y Alcantrillados (DENACAL), the executing agency, is to be built and advisory services will be provided to DENACAL in the fields of sanitary engineering and the operation of water supply and sewerage systems. Execution of this program will contribute to attainment of the social objectives of Nicaragua's National Reconstruction and Development Plan. The health conditions of people in the localities to be benefited are expected to improve substantially. The groups to benefit most from the project have comparatively low income levels and consist primarily of families with only one member employed, who lack access to credit and who own no housing or other fixed assets.

Date Approved: September 23, 1976 (IDB)

INDUSTRIAL CREDIT: The credit program which these IDB loans will help support involves granting medium- and long-term loans, through intermediary banks, to enterprises engaged in agro-industry, manufacturing and construction. An associated technical assistance program will help finance training activities for the personnel engaged in implementing the credit program. Proceeds of the IDB loans are to be used to finance the direct and indirect foreign exchange costs of the acquisition of industrial machinery, equipment, tools, and the construction of plant facilities; technical cooperation; and inspection and supervision.

Borrower: Republic of Nicaragua.

Terms: $12.0 million equivalent from the Fund for Special Operations. Term of 40 years at 1 percent interest per annum during the first 10 years and 2 percent per annum thereafter. $3.0 million equivalent from Ordinary Capital resources. Term of 25 years at 8.6 percent interest per annum. Total project cost: $20.0 million equivalent.

Purpose & Benefits: The principal purpose of this credit program is to stimulate the establishment of new, and expansion of existing, companies, cooperatives, and other group associations active in agroindustry, manufacturing and construction. Emphasis is to be placed on activities which increase exports or substitute for imports, enhance the use of local raw materials in manufacturing, and strengthen the construction industry in the interior of Nicaragua. Adequate preparation of qualified personnel in the practical aspects of agroindustrial management, project preparation and project implementation are other goals of the program.

Date Approved: November 18, 1976 (IDB)

ROADS: This loan will help finance the construction and improvement of approximately 300 kilometers of roads in various regions of Nicaragua. Criteria for the selection of roads under the program include the following: (a) the roads must be connected directly to the existing network, (b) each road selected should have an internal rate of return exceeding 10 percent, and (c) the characteristics and designs of the road must be such that it can be finished within five years from the effective date of the IDB loan contract. In addition, the program specifies that the roads must be consistent with the recommendations of the Nicaraguan National Transport Plan and are among those studied under a previous IDB Technical Cooperation Agreement with Nicaragua.

Borrower: Republic of Nicaragua.

Terms: $18.0 million equivalent from the Fund for Special Operations. Term of 40 years at 1 percent interest per annum during the first 10 years and 2 percent per annum thereafter. Total project cost: $22.5 million equivalent.

Purpose & Benefits: The main objective of this project is to provide all-weather road links between agricultural areas and consumption and marketing centers in the Central and Pacific Regions of Nicaragua. Improved year-round transportation of agricultural products should reduce food costs and bring new farming areas into production. Higher production will, in turn, help raise farm incomes and an efficient transportation system will also be important for implementing other projects related to integral rural development in such fields as education, public health, drainage, electrification, irrigation, agricultural and forestry development schemes.

Date Approved: December 9, 1976 (IDB)

PANAMA

INDUSTRY: This loan will be used by the Banco Nacional de Panama (BNP), an autonomous State entity, to extend medium- and short-term credits to small and intermediate producers to expand and improve industrial manufacturing companies in the private sector. The objective is to finance economically viable projects which contribute to developing industrial production to meet basic national consumer needs, help improve industrial productivity and promote export expansion and import replacement. Projects are also selected on the basis that they help accelerate economic and social development by providing more job opportunities, encourage establishment of industries in the interior and increase the use of farm outputs, intermediate goods and raw materials of national origin. Credits approved under the BNP program are to be used to cover fixed investments as well as working capital.

Borrower: Banco Nacional de Panama.

Terms: $3.0 million equivalent from the Fund for Special Operations. Term of 24 years at 2 percent interest per annum and $2.0 million equivalent from Ordinary Capital resources. Term of 20 years at 8.6 percent interest per annum. Total project cost: $7.5 million equivalent.

Purpose & Benefits: Taking into account current levels of development in the industrial sector to be served with the resources made available under this program (small- and medium-size firms), it is estimated that about 900 new jobs, generating average annual total wages of $290,000 equivalent, will be created. This should make a significant contribution to alleviating Panama's unemployment problems.

Date Approved: December 9, 1976 (IDB)

HIGHWAY: This loan will help finance construction of 23 kilometers of high-speed four-lane highway between the towns of Arraijan and Chorrera (west of the Panama Canal Zone) which will roughly parallel the existing, congested, Pan American Highway. The new highway will have the capacity to handle about 36,000 vehicles daily and will increase traffic capacity in the urban Arraijan-Chorrera corridor where the Pan American Highway is currently saturated with average daily traffic of about 8,000 vehicles. A 50-meter right-of-way on each side of access to the highway will permit the future construction of additional lanes, as needed, after 1996.

Borrower: Republic of Panama.

Terms: $22.0 million equivalent from Ordinary Capital resources. Term of 20 years at 8.6 percent interest per annum. Total project cost: $36.6 million equivalent.

Purpose & Benefits: The new highway is related to the Space Organization Plan of the Panama City Metropolitan Area and the proposed new residential town at Vista Alegre, adjacent to the fishing port of Vacamontes. The planned new town is expected to have a population of about 20,000 inhabitants. This will lead to a greater number of vehicles using access roads in the area with the increase in vehicular flow ascribable also to the needs of the population of this area to communicate with Panama City. Completion of the new highway project will relieve traffic congestion in the Panama City area, expand urban development areas, provide a safer road and reduce traffic accident frequency, reduce transportation costs, and encourage tourist-related activities.

Date Approved: December 16, 1976 (IDB)

TOURISM: This loan will help finance the construction of buildings, the provision of equipment, and the restoration of historical monuments, and related facilities to increase the flow of tourists and international convention business to Panama. The Panama Viejo Subproject includes: construction of control stations, a cultural center and related facilities, and the restoration of historical monuments. The Casco Antiguo Subproject includes construction of a parking garage, restoration of historical monuments, and the construction of other facilities for tourists. The Convention Center Subproject involves building and equipping a modern building of about 4,800 square meters with related civil works while a Technical Cooperation Subproject comprises contracting for the services of specialists in the execution and administration of tourism development projects.

Borrower: Republic of Panama.

Terms: $24.0 million equivalent from Ordinary Capital resources. Term of 20 years with interest at 8.35 percent per annum. Total project cost: $43.8 million equivalent.

Purpose & Benefits: Panama receives about one percent of world visitor arrivals and 3.9 percent of total Latin American and Caribbean visitor arrivals, amounting to 272,800 visitors annually spending about $80.0 million equivalent (1974 data). In addition, Panama also has about 350,000 transit travelers through Tocumen International Airport who spend more than $36.0 million equivalent annually. Public sector income from tourism amounts to 4 percent of Panama's gross domestic product and about 8 percent of Panama's gross current account foreign exchange earnings. About 9,500 persons are directly or indirectly employed in the tourism sector (2 percent of Panama's economically active population). This project is expected to create 3,300 new jobs during the construction phase and, over the longer run, should create 536 new permanent jobs in the operation and maintenance of the new tourism facilities. The project will also directly benefit another 72,000 people living in Panama City through construction of a potable water distribution system. It is estimated the project will increase tourism's contribution to Panama's gross domestic product from 4 percent to 5 percent and assist the country's balance of payments situation by providing, exclusive of IDB loan service costs, a net foreign exchange inflow of $2 to $6 million equivalent annually.

Date Approved: March 17, 1977 (IDB)

PARAGUAY

SANITATION: The project which this IDB loan will help finance involves continuation of the construction of the Asuncion urban storm sewerage system. This phase will service about 490 hectares in the central area of the city, directly benefiting the entire metropolitan area by helping to avoid disruptions and damage to commercial, public, educational, social and service activities whenever there is a moderate rainfall in the area.

Borrower: Corporacion de Obras Sanitarias (CORPOSANA). *Guarantor:* Republic of Paraguay.

Terms: $11.6 million equivalent from the Fund for Special Operations. Term of 40 years at 1 percent interest per annum during the first 10 years and 2 percent per annum thereafter. Total project cost: $14.8 million equivalent.

Purpose & Benefits: The city of Asuncion has an average annual rainfall of 1,350 mm. most of which occurs between the months of October and March. On the average, Asuncion has 84 rainy days each year, of which 40 days involve rainfalls of a minimum intensity of 15 mm. and a minimum duration of 30 minutes. Such storms in the urban area of Asuncion are considered to be hazardous and cause considerable damage to persons and property. In addition to these meteorological factors, the tropical location of the city, its topographic features, and the construction density (primarily in the central core) dictate an absolute technical and environmental need for minimum urban infrastructure including effective storm-water sewerage facilities. At the present time, the storm-water sewerage system is the only urban infrastructure component which is lacking in Asuncion and its completion is a matter of high priority. Completion of the system should help eliminate the health problems caused by the leakage of rainwater into the sanitary sewer system and the subsequent overflows from that system.

Date Approved: November 24, 1976 (IDB)

PERU

PREINVESTMENT STUDIES: This loan will be used by the Corporación Financiera de Desarrollo (CO FIDE) to extend medium- and long-term credits to governmental and private enterprises to finance general studies and studies of projects high on the priority list for Peru's economic and social development. The studies are to be done by qualified consultants to be engaged especially for these purposes.

Borrower: Corporación Financiera de Desarrollo de Perú (COFIDE). *Guarantor:* Republic of Peru.

Terms: $8.0 million equivalent from the Fund for Special Operations. Term of 20 years at 2 percent interest per annum. $2.0 million equivalent from Inter-Regional Capital resources. Term of 20 years at 8.6 percent interest per annum. Total project cost: $20.0 million equivalent.

Purpose & Benefits: COFIDE has developed a substantial body of standards and mechanisms for promoting and preparing preinvestment studies. In general, these standards and mechanisms have been so shaped as to be reasonably consistent with standards used by the international development lending institutions. In preinvestment in particular, COFIDE has demonstrated the capacity to implement programs of this type and during the last three years has approved preinvestment loans at an annual average of $9.7 million equivalent, with an average of 35 loan operations yearly. The potential demand for preinvestment studies financing between 1976 and 1978 is estimated to be about $94.7 million equivalent, of which about $40.1 million equivalent will require foreign exchange financing. Completion of preinvestment studies of this magnitude should make possible follow-on project investments of $176 million in agriculture, $332 million in agri-business and industry and more than $1.6 billion in the mining sector. (All US$ equivalents.)

Date Approved: September 16, 1976 (IDB)

MINING: This development project covers two priority elements forming the first stage of a CENTROMIN expansion program, to be executed during the period 1975–1980, designed to increase production of that company's major products, increase the proportion of refined production output, and improve mine production efficiency through economies of scale and plant modernization. The two specific elements of the program which the IDB loan will help finance are, with respect to the Cobriza mine: (a) increase production of copper ore and concentrates; (b) improve the operating efficiency of the mine; (c) reduce mine and concentrator operation costs; and (d) provide ancillary service plant and personnel infrastructure. With respect to the Cerro de Pasco mine water treatment plant, the project will continue efforts to extract copper from the mine's waste water and reduce contamination to levels below the maximum permissible under applicable legislation so as to prevent further damage to local rivers.

Borrower: Empresa Minera del Centro del Peru (CENTROMIN). *Guarantor:* Republic of Peru.

Terms: $33.4 million from Inter-Regional Capital resources; 15 years term at 8.6 percent interest per annum. Total project cost: $176.2 million equivalent.

Purpose & Benefits: The mining sector continues to play a dominant role in Peru's economic development. Nearly all of the country's mineral production is exported and the sector is the principal source of Peru's foreign exchange earnings. Mining sector exports have accounted for about 50 percent of Peru's merchandise exports during the past several years and amounted to $850 million equivalent in 1974. Copper is the principal mineral export, accounting for about half of the sector's exports, by value, over the last decade. The principal objectives of the Government's investment program in the mining sector, which could approach the equivalent of $2 billion during the period 1975–1980, are to increase foreign exchange earnings substantially through increasing the volume of mineral exports and to produce processed minerals with a higher value-added domestic component. At the same time, the program aims to achieve numerous social objectives in the sector through improvements in housing, health, education and environmental standards. This investment program is expected to increase the annual value of Peru's mineral exports to about $1.5 billion equivalent by 1980, or 70 percent higher than the 1974 level.

Date Approved: September 16, 1976 (IDB)

AGRICULTURE: This loan will help finance a program for granting supervised agricultural credit to small- and medium-sized farmers organized into the Associative Peasant Production Enterprises (ECAS) on the basis of plans prepared for the development of each associative entity. Eligible ECAS include: Agrarian Production Cooperatives, Communal Production Cooperatives, Agricultural Societies of Social Interest, and Peasant Communities with enterprise structure. Program resources will also be used to grant supervised agricultural credit to beneficiaries in the 12 irrigation zones developed with the assistance of a previous IDB loan. This credit will be granted to farmers on an individual basis or through the various forms of associative entities created in these zones.

Borrower: Banco Agrario del Peru. *Guarantor:* Republic of Peru.

Terms: $30.0 million equivalent from the Fund for Special Operations. Term of 30 years with interest at 2 percent per annum. Total project cost: $50.0 million equivalent.

Purpose & Benefits: The objectives of this credit program are to increase agricultural production by small- and medium-sized farmers—especially food production—to increase their productivity and raise income and employment levels, and to consolidate, socio-economically, the several forms of associative entities which have been organized in Peru's rural sector. Over the past decade, a widespread land reform program has been executed on both the coast and in the highlands, which has led to the distribution of 8.3 million hectares of land to about 300,000 families, some 80 percent of which have been organized into associative entities.

This program has included efforts to assure land titles to those not directly affected by the land reform and has begun the process of consolidating and developing the agriculture sector to raise productivity, increase production and employment. The BAP has been designated to play a special role in this and has been restructured more efficiently to assist, through credit, the Government's development strategy for the sector.

Date Approved: December 22, 1976 (IDB).

URUGUAY

INDUSTRY: This IDB loan will help finance the second stage of a credit program for the private meat-packing industry of Uruguay. The objectives of the program include: (a) increasing the earning capacity of plants by eliminating production bottlenecks and making better use of rendering process by-products, (b) continuing improvements in existing facilities to ensure that Uruguayan beef exports meet market quality requirements, and (c) increasing the value added to export products by introducing the processing of nontraditional lines such as canned meat, pre-cooked frozen products, ground meat and convenience meals. The program would also help to increase processing facilities for frozen meat for export.

Borrower: Republic of Uruguay.

Terms: $15.0 million equivalent from Ordinary Capital resources. Term of 15 years at 8.6 percent interest per annum. Total project cost: $21.4 million equivalent.

Purpose & Benefits: Economic conditions in Uruguay improved significantly during 1975 largely because of the dynamism of manufacturing which accounts for nearly 25 percent of Uruguay's GDP. During the first quarter of 1976, growth in this sector (which includes meat packing) was nearly 5 percent higher than in the corresponding quarter of 1975. Dynamism in this sector, however, is tied closely to the development of export industries and manufacturing currently accounts for more than 80 percent of the FOB value of Uruguay's exports. Major recovery in the meat packing industry subsector is one of the principal reasons for the recent favorable performance of Uruguay's industrial sector as a whole. The diversification of the Uruguayan meat processing industry, which should be aided under this program, in addition to increasing exports by developing new markets, will tend to reduce the vulnerability of Uruguayan industry to fluctuations in external markets.

This is IDB's third loan emphasizing modernization of the Uruguayan meat packing industry. It is expected that implementation of this current program will create new jobs and help raise the wage levels of workers employed in this industry.

Date Approved: November 24, 1976 (IDB)

REGIONAL

PREINVESTMENT STUDIES: The proceeds of this loan will be used to grant medium- and short-term credits for the execution of studies of high priority development projects in Central America. The projects to be studied will be those which will foster the economic integration process in Central America, help strengthen development planning processes and, in particular, joint planning for certain projects of regional interest compatible with the development plans of the five Central American countries, and which also improve Central America's capacity to absorb external financing by identifying priority projects in both the public and private sectors.

Borrower: The Central American Bank for Economic Integration (CABEI).

Terms: $8.0 million equivalent from the Fund for Special Operations. Term of 30 years at 1 percent interest per annum during the first 10 years and 2 percent per annum thereafter. Total project cost: $11.0 million equivalent.

Purpose & Benefits: The Central American economic integration process, although it has provided some undeniable benefits, has experienced a loss of dynamism which has tended to impede the development efforts of the countries in this region. Efforts to reinvigorate this regional integration movement have included negotiation of a new standard treaty aimed at creating a Central American Economic Community. These broader efforts, however, need to be supplemented with specific activities, and particularly activities with multiple, five-country, approaches. The program of preinvestment studies which this IDB loan will help finance responds to this need. It is anticipated that the studies will cover about thirty public sector projects and twenty private sector projects representing aggregate total potential investment in excess of $500 million equivalent. This includes about $145 million equivalent in tourism, $130 million equivalent in transportation and $110 million equivalent in electrification projects.

Date Approved: November 11, 1976 (IDB)

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ASIAN DEVELOPMENT BANK

AFGHANISTAN

AGRICULTURE: These ADB loan funds will help finance the establishment of modern seed production farms, seed processing plants, storage facilities, and other services for the production and distribution of certified seeds to farmers, with special reference to increased wheat and cotton production.

Borrower: Republic of Afghanistan.

Terms: $14.0 million equivalent from ADB Special Funds resources. Term of 40 years with a 1 percent service charge per annum. Total project cost: $17.6 million equivalent.

Purpose & Benefits: The internal economic rate of return for this project is estimated to be about 45 percent. The principal benefit from the project will be increased production of about 323,000 tons of wheat and 32,500 tons of seed cotton plus substantial quantities of cotton lint, seed cake and cottonseed oil which, it is estimated, will be valued at about $70 million equivalent annually when the project is in full operation. The incomes of about 200,000 beneficiary farmers are expected to increase from between $17 and $80 per ha. (dollar equivalents), and, for 1,500 contract growers, increased net revenue per ha. is estimated at between $84 and $212 (equivalents). In addition to direct employment by the Afghan Seeds Company of more than 700 persons, the project will provide numerous indirect benefits through encouraging self-sufficiency in wheat, increasing foreign exchange earnings through exports of cotton, and optimizing benefits from the sizable public investments in irrigation and fertilizer distribution facilities.

Date Approved: October 21, 1976 (ADB)

BANGLADESH

INDUSTRY: These loan funds will help finance the foreign exchange costs of technical services to plan and prepare a urea fertilizer plant project. The project comprises providing technical, advisory, and consulting services in three phases with the objective of establishing a urea fertilizer plant at Chittagong, the development of a gas system at Bakhrabad and a 200 km. gas transmission pipeline system from Bakhrabad to Chittagong.

Borrower: People's Republic of Bangladesh.

Terms: $2.5 million equivalent from ADB Special Funds. Term of 10 years at 1 percent service charge per annum. Total project cost: $2.66 million equivalent.

Purpose & Benefits: Unless steps are taken now to bring additional fertilizer manufacturing capacity on stream by 1983, local urea production is expected to fall short of projected domestic demand. The total cost of the proposed Plant and Gas System is estimated at $361.0 million equivalent with a foreign exchange component of $212.0 million equivalent. The Plant is expected to produce 1,000 metric tons of ammonia and 1,730 metric tons of urea per day and is scheduled for completion in 1981 following the technical services to be provided under this loan.

At full operation the fertilizer Plant is expected to earn more than $50 million equivalent annually in foreign exchange. In addition to providing feedstock and fuel for the Plant, it is estimated that the Gas System will encourage the development of industries in Chittagong, and substitute for about $50 million equivalent of imported petroleum fuels each year.

Date Approved: November 23, 1976 (ADB)

DEVELOPMENT FINANCE COMPANY: The proceeds of this loan will be used for relending to industrial enterprises in both public and private sectors in Bangladesh for specific, development-oriented, projects.

Borrower: People's Republic of Bangladesh.

Terms: $25.0 million equivalent from the ADB's Special Funds. Term of 40 years with a 1 percent service charge per annum.

Purpose & Benefits: Bangladesh Shilpa Rin Sangstha (BSRS) lending operations were at a relatively low level during 1973 and 1974 because of financial resource constraints and uncertainties in the Bangladesh industrial sector following the nationalization of industries in 1972. In December 1975 the Government promulgated a revised Industrial Investment Policy, under which the ceiling on investments was raised from $2.0 million (established in July 1974) to $6.6 million (equivalents) for private sector investment. These revised investment policies of the Bangladesh Government helped restore the confidence of private entrepreneurs and led to an increase of BSRS' loan approvals, from $9.1 million in 1975 to $13.2 million (equivalents) in 1976. Foreign exchange loans constituted the majority (about 82.6 percent) of total loans approved, amounting to $27.1 million (equivalent) during the period 1973–1976. Local currency lending has been traditionally limited and was further restricted by the lack of locally available machinery supplies. Loan approvals during the 1973–1976 period included 57 percent for the textile sector, including two large sub-loans for financing cotton spinning projects. As a result of its promotional activities, the BSRS has become increasingly involved in other sectors and this diversification trend is likely to continue. BSRS activities also support the Bangladesh Government's policy of geographically dispersing industries to the less developed areas of that country.

Date Approved: December 16, 1976 (ADB)

AGRICULTURE: This loan will help finance the foreign exchange costs and a portion of the local costs of an integrated rural development project in four districts of Serajgonj Subdivision, Pabna District.

Borrower: People's Republic of Bangladesh.

Terms: $26.0 million equivalent from ADB Special Funds. Term of 40 years at one percent service charge per annum. Total project cost: $45.2 million equivalent.

BANGLADESH—Continued

Purpose & Benefits: This project will be one of the major integrated rural development programs in Bangladesh. It is designed to provide complete protection from annual flooding and supply irrigation to an area covering about 110,000 acres. Substantial increases in the production of various crops, fish and livestock will result from this project. In addition, rural infrastructure will be improved as will social services for the betterment of income, employment and the quality of life for the 905,000 persons in the project area. The project has a high economic rate of return of 29 percent. Its economic benefits arise mainly from agriculture: at full development of the project, incremental production is estimated at about 51,000 tons of paddy, 51,000 tons of wheat, 13,000 tons of oil seeds, 19,000 tons of sugar cane, 15,000 tons of vegetables and 205,000 tons of fodder annually. The net incremental value of this production is expected to be about $24 million equivalent annually after allowing for increased allocations for fertilizer, crop protection chemicals, irrigation costs and other inputs. Corollary investments in health and family planning facilities and services and community programs will also yield broad benefits to the population in the project area.

Date Approved: December 23, 1976 (ADB)

TRANSPORTATION: This loan will be used to help finance the foreign exchange costs and a portion of the local costs of building about 22 miles of new two-lane bituminized highway between Khulna and the new Port of Chalna at Mongla. The loan will also provide two motorized ferries and two pontoon jetties and related consulting services.

Borrower: People's Republic of Bangladesh.

Terms: $15.0 million equivalent from ADB Special Funds. Term of 40 years with a service charge of 1 percent per annum. Total project cost: $20.5 million equivalent.

Purpose & Benefits: This project is an integral part of the Bangladesh Government plan to extend the national highway network as needed for development of the nation's economy. Without this highway, traffic between Khulna and Chalna Port would depend entirely on slow and inefficient inland water transport facilities which are already seriously congested. The project will thus help relieve much of this congestion and will reduce considerably the cost of transporting about 675,000 tons of commodities annually to and from the port. The new road is also expected to open up the agricultural hinterland area between Khulna and Mongla. The introduction of bus service for an estimated one million passengers annually beginning in 1981 is another benefit of the project. Round trip travel time between Khulna and Mongla should be reduced, as a consequence, from six hours to about two hours. This will also help reduce spoilage of farm products and increase the incomes of farm households in the project area. The estimated economic internal rate of return for the project is 17 percent, calculated on the basis of commercial prices, net of duties, taxes and other transfer charges.

Date Approved: May 10, 1977 (ADB)

BURMA

FORESTRY: This project focuses on rehabilitation and improvement of Burmese Timber Corporation (TC) extraction operations in Upper Central Burma. The immediate objectives are to increase both foreign exchange earnings and domestic sawnwood supply. Activities foreseen for this purpose involve removing a backlog of 280,000 cu.m. of teak from the project area, maintaining an annual allowable cut of 110,000 cu.m. of teak with increased yield per tree, increasing the extraction of other tropical hardwoods from the present 240,000 cu.m. to about 336,000 cu.m., increasing the output of sawn timber from the current level of 75,000 cu.m. to about 130,000 cu.m. annually, reducing log losses and wastage and reducing log transit time from felling to sawmill and port.

Borrower: The Socialist Republic of the Union of Burma.

Terms: $25.1 million equivalent from the Bank's Special Funds. Term of 40 years with a 1 percent service charge per annum. Total project cost: $44.2 million equivalent.

Purpose & Benefits: Over a ten-year period total net incremental benefits attributable to the project are estimated at about $328 million equivalent, in terms of foreign exchange earnings and expansion in domestic supplies of sawnwood. The project will provide permanent employment for more than 8,600 persons and about 1,000 seasonal jobs in road construction and log extraction operations. Over the longer run, the project will contribute to the more rational utilization of Burmese forest resources by widening the range of species harvested, reducing wastage and losses, and enlarging the scope for processed timber exports. An important component of the project is designed to help institution building through technical training and the use of modern management techniques such as costing and monitoring systems and worker incentive schemes. The linkage to be provided by the all-weather roads to be built under the project will improve communications and open up the remote northern township areas, thus contributing to overall development of the area. The project is estimated to have an economic internal rate of return of more than 100 percent. The estimated financial rate of return to the TC is 14.2 percent and to the Burmese Government more than 100 percent.

Date Approved: February 10, 1977 (ADB)

GILBERT ISLANDS

TRANSPORTATION: This loan will help finance the foreign exchange costs of a causeway to link the Islands of Betio and Bairiki in South Rarawa, the only urban area in the Gilbert Islands.

Borrower: Government of the Gilbert Islands.

Terms: $1.8 million equivalent from ADB Special Funds resources. Term of 40 years at 1 percent service charge per annum. Total project cost: $2.7 million equivalent.

Purpose & Benefits: The project will provide an improved and more economical link between Betio and Bairiki than does the existing ferry service and associated infrastructure which, if the causeway were not to be built, would require improvements and involve overall higher operating costs in any event. Several other important social and economic benefits are expected to derive from construction of the causeway. These include additional administrative efficiency and improved viability of the Government's growing commercial and semi-commercial operations, easier access to South Tarawa's only hospital at Bikenibeu, faster and more economical transportation of imported goods from Betio to the remainder of South Tarawa and increased access to specialized education facilities. The economic rate of return on the project is estimated at about 24 percent.

Date Approved: November 18, 1976 (ADB)

HONG KONG

URBAN DEVELOPMENT: The proceeds from this loan will help finance a portion of the foreign exchange costs of building two housing estates and associated facilities (schools, a health clinic and a fire station) for the Sha Tin Urban Development Project.

Borrower: Government of Hong Kong.

Terms: $20.5 million equivalent from Ordinary Capital resources. Term of 13 years with interest at 8.7 percent per annum. Total project cost: $100.7 million equivalent.

Purpose & Benefits: The Government of Hong Kong accords high priority to this project as a means of alleviating pressures caused by the very high population density on Hong Kong Island and in Kowloon. This ADB loan for the project will have direct social and economic impact, particularly for low income groups, by helping to provide accommodations to those currently housed under sub-standard conditions or who cannot afford private housing. The Government's policy of developing new areas will contribute both to the redistribution of population (and thus reduce congestion in some areas) and to reducing social tensions which often stem from such factors as overloaded transport facilities and community services and pollution. A number of other social benefits are expected to be derived from better housing including an improvement in the general state of health and school performance of students and lower crime and drug addiction rates.

Date Approved: April 14, 1977 (ADB)

INDONESIA

URBANIZATION: This technical assistance loan will assist in financing the foreign exchange costs of consulting services and equipment needed to prepare a long-term Urban Development Plan and undertake a feasibility study for the first stage of an urbanization project for Bandung Municipality.

Borrower: Republic of Indonesia.

Terms: $1.2 million equivalent from Ordinary Capital resources. Term of 10 years with interest at 9.1 percent per annum. Total project cost: $1.8 million equivalent.

Purpose & Benefits: This Bandung city project will entail preparation of a long-term Urban Development Plan and the undertaking of a feasibility study for the first stage of the Plan for Bandung Municipality. The Plan will be designed to assist the Government of Indonesia in directing needed long-term urban development with particular emphasis on demographic and socio-economic factors, employment opportunities, housing and sanitation. The study, to be consistent with, and a part of, the Plan, will help the Government formulate a well-defined first stage urban development project as the basis for subsequent investment decisions. The Bandung project will be aimed at improving living conditions among the urban poor. The Indonesian Government is making every effort to correct this situation, but management and resource constraints compel substantial reliance on external assistance and concentration on the most urgent problems.

Date Approved: August 26, 1976 (ADB)

TRANSMIGRATION: This technical assistance loan will help finance part of the foreign currency costs of consulting services and equipment in the preparation of a 10-year outline plan and feasibility study for the development of existing, and identification of new, priority, settlements for migrants to Sulawesi.

Borrower: Republic of Indonesia.

Terms: $280,000 equivalent from the Ordinary Capital resources of the ADB. Term of 10 years with interest at 9.1 percent per annum. Total project cost: $720,000 equivalent.

Purpose & Benefits: South East Sulawesi is one of the least developed provinces of Indonesia and has considerable amounts of unexploited land and water resources which could support large scale settlements. Four large plains, comprising 180,000 ha. of land suitable for irrigation and agricultural development characterize the Sulawesi project area to be studied under this loan. More than 3,000 families have already been settled and it is proposed to settle an additional 16,450 families in the region during the plan period. The main objective of the Sulawesi project is to assist the Government in preparing an overall outline plan for the full development of the project area and detailed plans and a feasibility study for the development of existing settlements as well as new priority settlements. The Sulawesi project would also encompass preparation of an overall ten-year plan for development of the project area, with particular reference to settlements, formulation of detailed plans and a feasibility study for the first phase of development, and drafting recommendations for needed studies and surveys relevant to the future development of potential areas for settlements during the second phase of the project.

Date Approved: August 26, 1976 (ADB)

TRANSPORTATION: The proceeds of this loan will help finance a substantial portion of the foreign exchange costs of constructing a 33.5 km. four-lane access-controlled highway between Surabaya Port and Porong, a 5.5 km. two-lane access-controlled road from Porong to Gempol, the widening of selected sections and resurfacing of the road between Porong and Malang, the foreign exchange costs of engineering consultant services, and maintenance training.

Borrower: Republic of Indonesia.

Terms: $48.2 million equivalent from Ordinary Capital resources. Term of 25 years at 8.9 percent interest per annum. Total project cost: $128.0 million equivalent.

Purpose & Benefits: The project is designed to increase the capacity of a vital arterial road, parts of which rank among the most heavily travelled roadways in Indonesia. The project will permit the unrestricted flow of port traffic and industrial output from Surabaya and the flow of provincial agricultural produce and industrial inputs into major consumer markets. The economic internal rate of return for the project is estimated at about 30 percent for the new Surabaya to Gempol highway, 41 percent for the sections to be widened and resurfaced of the existing Porong-Melang road, and 31 percent for the project as a whole.

Date Approved: October 28, 1976 (ADB)

KOREA

AGRICULTURE: The project this ADB loan will help to finance has several principal components: (a) land improvement, covering about 12,000 ha., including new irrigation systems and the rehabilitation of existing irrigation systems, land consolidation and reclamation, drainage systems, stream improvement and construction of feeder roads; (b) soil conservation and reforestation covering 4,000 ha.; (c) establishment of marketing facilities including a collecting and grading center, warehouse and rice mills, farm mechanization and the importation of dairy cattle; (d) agricultural extension through training centers and sub-watershed development demonstrations; (e) village water supply for 20,000 homes; (f) modernization of a Provincial Hospital; (g) village level development including improvement of small irrigation and drainage facilities; and (h) consulting services including an area development expert, drainage engineer, and an agronomist.

Borrower: Republic of Korea.

Terms: $32.0 million equivalent from Ordinary Capital resources. Term of 27 years at 9.1 percent interest per annum. Total project cost: $78.9 million equivalent.

Purpose & Benefits: The direct economic benefits of this project will accrue principally from increased agricultural and dairy production. The economic internal rate of return of the project is estimated at 17 percent. Although the economic benefits from village water supply, soil conservation, reforestation, hospital modernization and village level development are difficult to quantify, these components will have substantial supplementary and complementary effects on the integrated development of the project area (Namgang). It is estimated that the per capita annual income for an average sized farm in the area will increase by 20 percent and the project will provide new employment opportunities of about 4 million man-days per annum during construction and 3 million man-days per annum after completion of the project. The project will have further considerable impact through the improvement of sanitary conditions and the health of village populations. By improving the income and living conditions of small farm holders, it is expected that migration from the project area to the Pusan and Seoul metropolitan areas will be reduced.

Date Approved: September 23, 1976 (ADB)

DEVELOPMENT FINANCE COMPANY: The proceeds of this loan will be used by Korea's Medium Industry Bank (MIB) to extend foreign exchange loans to productive enterprises, primarily in the private manufacturing sector. Not more than 35 percent of the loan will be used to finance the textile industry and not less than 40 percent of the loan proceeds are to be used to finance subprojects in less developed regions of Korea.

Borrower: Republic of Korea.

Terms: $30.0 million equivalent from Ordinary Capital resources. Term of 15 years with 8.9 percent interest per annum.

Purpose & Benefits: MIB is the principal source of finance for small and medium enterprises in Korea and is virtually the only institution which provides foreign exchange loans for these firms. In addition to providing normal types of financial assistance to small and medium industry (short- and long-term loans in local and foreign currency) and to securing guarantees from the Government-controlled Credit Guarantee System, the MIB undertakes certain development-oriented activities such as extension services, feasibility study preparation and marketing and financial consultancy services. MIB's loan portfolio is of good quality. As of June 30, 1976, the ratio of loans in arrears to loans being repaid regularly was an acceptable 5.3 percent. The loan recovery position is well under control. However, MIB's provisions for possible bad debts need to be augmented and it has agreed to set aside adequate funds to cover possible bad and doubtful debts on a regular basis as may be required by the external auditor. As of June 30, 1976, MIB had unallocated foreign exchange resources of about $22.6 million consisting of $3.5 million from the third ADB loan and $19.1 million from the first IBRD loan. In addition, the Government of Korea recently allocated $6 million of its own foreign exchange resources to MIB. MIB's projected requirements for foreign exchange resources during 1977 and 1978 are about $67 million, of which $30 million will derive from this ADB loan and the remainder from the IBRD (equivalents).

Date Approved: December 23, 1976 (ADB)

MALAYSIA

FISHERIES: This ADB loan will help finance the foreign exchange costs of providing two hundred multipurpose vessels of about 12 to 15 gt. and related modern fishing gear, establishing an integrated trawler fishing operation including a fleet of 220 trawlers, five support facilities along the East Coast and furnishing insulated and refrigerated trucks. The project will also help finance consultants to assist in the procurement and management of these fishing operations and for undertaking a feasibility study for a fisheries project in the States of Sabah and Sarawak.

Borrower: Malaysia.

Terms: $27.0 million equivalent from Ordinary Capital resources. Term of 18 years at 9.1 percent interest per annum. Total project cost: $59.7 million equivalent.

Purpose & Benefits: This project is expected to increase fish production substantially and help meet growing demand in the Malaysian domestic market. Better equipped boats and supporting services will enable participating fishermen and other employees to increase productivity and income levels. These improved marketing and storage facilities will aid both producers and consumers of fish. The project will also generate export earnings estimated at about $5.1 million equivalent annually. The financial rates of return on the project and its components range from 18 to 23 percent and the economic rates of return range from 22 to 36 percent. The Malaysian Government has accorded high priority to this project which will be a major element in the national fisheries development program during the next several years.

Date Approved: September 16, 1976 (ADB)

WATER SUPPLY: This is a two-part project, reflecting the separate responsibilities of two Malaysian State Governments. Part A covers water supply systems at Muar and Segamat in the State of Johore. At Muar, existing capacity is to be increased by about 8 m.g.d. (million gallons per day) to meet projected demand to 1990 and increase the percentage of population served from 72 percent to 82 percent. At Segamat, existing capacity will be increased by around 2 m.g.d. to meet projected demand to 1990 and raise the percentage of population served in the project area from 70 percent to 80 percent.

Part B of the project covers water supply systems in Kota Bharu and Pasir Puteh in Kelantan State. In Kota Bharu, the project will involve ground water utilization to increase water supply system capacity to around 6.5 m.g.d. to meet projected demand to 1990 and to increase the proportion of population served in the project area from 34 percent to 65 percent. At Pasir Puteh, existing capacity is to be increased by around 1.2 m.g.d. to meet projected demand to 1990 and increase population served in the project area from 6 percent to 45 percent.

Borrower: Malaysia.

Terms: $15.0 million equivalent from Ordinary Capital resources. Term of 20 years at 8.9 percent interest per annum. Total project cost: $25.5 million equivalent.

Purpose & Benefits: The Third Malaysia Plan gives high priority to these projects as a means of reducing inequalities among the States and eradicating poverty among urban and rural poor. The project will ultimately improve health conditions in the areas covered and contribute actively to economic development. The systems adopted in each project area are least-cost solutions, the consultants having studied several alternative plans and computed present worth values at discount rates of 8, 10 and 12 percent. The sites for intake and treatment works were selected as the most suitable from the technical and economic points of view. The financial rates of return, on an incremental basis, are 7.4 percent for Muar, 5.2 percent for Segamat, 8.9 percent for Kota Bharu and 4.8 percent for Pasir Puteh.

Date Approved: November 23, 1976 (ADB)

PORT: This loan will help finance conversion of a general cargo berth at Penang Port to a container-roll-on/roll-off berth, plus the construction of a vegetable oil berth and the provision of consultant services for a feasibility study of the next phase in the port's development and a tariff study including a review of the financial management and accounting systems of the Penang Port Commission.

Borrower: Malaysia.

Terms: $10.0 million equivalent from Ordinary Capital resources. Term of 20 years at 8.7 percent interest per annum. Total project cost: $14.6 million equivalent.

Purpose & Benefits: The project has high priority in Malaysian Government planning and forms part of an overall program to develop and expand port facilities and related maritime services to meet Malaysia's growing needs caused by the expansion of its international trade. The project is deemed to be the most suitable intermediate scheme for developing Penang Port to cope with growing demand for container and vegetable oil facilities and to reduce congestion in the port. The economic and financial rates of return range from 13 to 27 percent for the various components of the project.

Date Approved: March 29, 1977 (ADB)

NEPAL

TRANSPORTATION: This ADB loan will finance the foreign exchange component of the cost overrun on the project to reconstruct and improve the 78 km. road between Hetauda and Narayangarh, including the construction of two-lane bridges over four large rivers, and consultant services for engineering design and supervision of road construction.

Borrower: Kingdom of Nepal.

Terms: $4.8 million equivalent from Special Funds resources of the ADB. Term of 40 years with a service charge of 1 percent per annum. Total project cost overrun: $8.5 million equivalent.

Purpose & Benefits: In October 1973, a Canadian firm of consultants was retained to prepare the detailed engineering and supervision of construction for this project. The engineering designs were completed in November 1974, tenders for civil works were invited from prequalified contractors in December 1974, and bids were closed in April 1975. After bid evaluation it was evident an overrun in the total cost of the project had developed. Possibilities for reducing design standards and revising the scope of the project were explored but found not feasible: reduction of the road to a single lane was impossible given the projected traffic volume with a preponderance of trucks and buses and a reduction in project scope would have had an adverse effect on the Nepalese Government's efforts to develop the Chitwan Valley, including the Bank-financed Chitwan Valley Development Project. The proposed supplementary loan for the project is justified in light of Nepal's foreign exchange reserve position and commitment of its foreign aid receipts to other development projects. The increase in construction costs for this road is due to abrupt and unexpected rises in the prices of construction materials, fuel and equipment stemming from the worldwide inflation which occurred subsequent to the ADB's original appraisal of the project in 1972.

Date Approved: September 14, 1976 (ADB)

INDUSTRY: The proceeds of this loan will help finance the foreign exchange costs (excluding working capital) of installing a 260,000 m.t. per year cement plant with auxiliary equipment and facilities. The loan will also help support limestone quarrying and an aerial ropeway transportation system near Hetauda in Nepal. Staff housing for cement plant and quarry personnel is to be provided. Professional services to be covered include technical and advisory services, general contracting and management services, and training for Nepalese managerial, supervisory and operating personnel.

Borrower: Kingdom of Nepal.

Terms: $39.5 million equivalent from ADB Special Funds resources. Term of 40 years at 1 percent service charge per annum. Total project cost: $59.1 million equivalent.

Purpose & Benefits: Approximately 80 percent of Nepal's cement consumption is on Government account, primarily in development and infrastructure projects such as highways, basic communication facilities, industrial zones being established to induce geographic industrial dispersion and create employment opportunities, hydropower projects in less-developed areas, and agriculture projects such as irrigation systems. Given the strategic importance of cement production, the Government attaches high priority to expansion of capacity in this industry. Domestic consumption of cement has almost doubled in the past seven years, from 71,500 m.t. in 1968–69 to 142,500 m.t. in 1974–75, or an annual growth rate of approximately 12 percent. The annual growth rate for the next ten years has been conservatively projected at 10 percent with current demand for cement estimated by the Nepal Planning Commission to be on the order of 160,000 to 170,000 m.t. yearly. Due to the rugged topography and geological structure of the limestone quarry, heavy mechanical equipment cannot be used for quarrying. Calculation of the financial internal rate of return for this project yields a satisfactory 14.8 percent return. Based on an economic price of cement of $55 per m.t., the economic internal rate of return on the project will be 13.4 percent.

Date Approved: November 29, 1976 (ADB)

AGRICULTURE: This loan will help finance the foreign exchange costs of installing and operating 2,800 shallow tubewells, 400 dug wells and related pumpsets. The resources will also be used to procure office equipment, vehicles for administration and supervision and fertilizer.

Borrower: Kingdom of Nepal.

Terms: $6.0 million equivalent from ADB Special Funds resources. Term of 40 years with a 1 percent service charge per annum. Total project cost: $7.9 million equivalent.

Purpose & Benefits: This project covers thirteen districts in Nepal's Terai region. In three of these districts, which have good prospects but where underground water resources are not yet proven, investigations are to be completed within a year. The total area of land to receive irrigation under this project will be about 15,000 ha. The thirteen project districts already have an irrigated area of 11,100 ha., equivalent to 42 percent of the total irrigated area in the country, and about 12 percent of Nepal's total cultivated area. Yields and cropping intensities on the 15,000 ha. to be newly irrigated are expected to increase substantially. It is estimated that with full development of the project, net farm family income on 3 ha. farms will increase from NRs 3,820 to NRs 9,534. At full development of the project it is anticipated that additional production of paddy will be about 29,000 tons, wheat 27,000 tons and maize 90 tons annually. Total foreign exchange earnings from exports of rice and wheat are estimated at $11.7 million equivalent during the first five years. The project's economic rate of return is about 38 percent.

Date Approved: February 15, 1977 (ADB)

PAKISTAN

PORT: This project is the First Phase in the development (1976–1980) of Port Qasim. Work involved includes construction of seven semi-bulk wharves and an iron ore and coal terminal, channel dredging, procurement and installation of other facilities and equipment including floating craft and navigation aids and related consultant services.

Borrower: Islamic Republic of Pakistan.

Terms: $48.6 million equivalent: $37.8 million equivalent from Ordinary Capital resources and $10.8 million equivalent from ADB Special Funds. Term of 25 years at 8.9 percent interest (Ordinary Capital) and 40 years at 1 percent service charge per annum (Special Funds). Total project cost: $220.0 million equivalent.

Purpose & Benefits: Numerous quantifiable and non-quantifiable benefits are expected to stem from this project. Substantial savings in ocean transport costs, port facilities, and rail transport costs will be achieved with the iron ore and coal terminal compared to transit through Karachi Port. The seven semi-bulk wharves at Port Qasim will also bring savings in ship waiting time and inland transport costs to the overall benefit of Pakistan. Port Qasim is about 48 km. from Karachi City center and will be relatively free of traffic and pollution problems. Construction of Port Qasim is thus consistent with Karachi Development Authority plans to encourage population dispersal away from Karachi City. All aspects of this project have been thoroughly examined in several studies and the plan for port development has been well prepared. The estimated economic internal rate of return is about 32 percent. The project's internal financial rate of return is estimated at 5.5 percent, which is considered reasonable, given the heavy infrastructure investment involved.

Date Approved: November 18, 1976 (ADB)

PAPUA NEW GUINEA

WATER SUPPLY: This project entails the provision of water supply facilities and engineering consultant services in Lae, Mount Hagen and Wewak, including appropriate investigation of groundwater potential. The project will augment existing water supply facilities in Lae and provide public piped water supply for the first time in Mount Hagen and Wewak. The designed facilities are expected to meet local water demand up to 1986, with a small scale augmentation in 1983 when the size and direction of the expansion of the municipalities become more evident. For Lae, Mount Hagen and Wewak, the facilities to be provided under the project will include supply source works; reservoirs; transmission, distribution and internal network mains; service connections, meters and fordilla taps; meter testing and repair shops; and transport vehicles.

Borrower: The Independent State of Papua New Guinea.

Terms: $13.5 million equivalent from ADB Special Funds resources. Term of 40 years with a 1 percent service charge per annum. Total project cost: $19.9 million equivalent.

Purpose & Benefits: The project has substantial social benefits and will contribute significantly to the improvement of public health and sanitation in Lae, Mount Hagen and Wewak and will lay the ground work for improvements subsequently in Madang for which the Bank may consider another loan at a later date. The project will eliminate the dependence of the three municipalities on the unreliable and unsatisfactory collection of rain water in storage tanks and on questionable sources of water supply during the dry season. In addition to domestic consumption, the project will also help satisfy shipping, commercial, industrial and institutional water demands. The internal financial rates of return for the municipalities involved are expected to range from a low of 5.5 percent to a high of 7.7 percent.

Date Approved: November 11, 1976 (ADB)

AGRICULTURE: The proceeds of this loan will help finance the East Sepik rural development program which includes the Gavien Land Settlement scheme, establishment of a buffalo breeding herd and smallholder buffalo farms, facilities to promote inland fishing on the Sepik River, intensification of crop production, establishment of an agriculture research program and strengthening of facilities for teaching agriculture and nutrition in schools, and establishment of an agricultural college.

Borrower: The Independent State of Papua New Guinea.

Terms: $7.7 million equivalent from ADB Special Funds Resources. Term of 40 years with a 1 percent service charge per annum. Total project cost: $10.4 million equivalent.

Purpose & Benefits: Papua New Guinea places considerable emphasis on self-reliant rural development—90 percent of the population lives in rural areas and depends on agriculture as the main source of income. Agriculture is gradually evolving from transitional, largely subsistence, farming to market gardening and cash cropping, and from the dominantly foreign-controlled plantation sector to increasing smallholder interests. Papua New Guinea has substantial fertile land resources, low population density, favorable geo-climatic conditions, significant forestry and fishery resources, and fairly well assured internal and external marketing outlets for output. The main constraints on growth are the slow response of an essentially traditional social structure and the lack of adequately trained and experienced manpower. The principal benefits to the economy from this rural development program will be increased agricultural and fisheries production, leading to higher exports and reduced imports. The incremental production value from the program at full development is estimated at about $5.4 million equivalent per year. Non-quantifiable benefits will include improved levels of general education, vocational training and community nutrition. This project focuses particularly on the poorest segments of population such as the landless and those with very small land holdings, farmers on poorly drained grasslands and subsistence fishermen on the Sepik River. Approximately 28,000 families, a significant proportion of the project area total population, are to be involved in four market-oriented sub-projects. The internal rate of return for program elements with immediate production impact (excluding education and research) is estimated at about 16 percent.

Date Approved: December 21, 1976 (ADB)

PHILIPPINES

IRRIGATION: This loan will help finance construction of irrigation and related facilities including drainage works, flood dikes, service roads, land development and on-farm facilities covering an area of about 15,080 ha. Other elements in the project include a pilot farm, extension services, additional equipment for public health care and rural water supply facilities, a water management training center and consulting services for design and construction supervision. In order to control schistosomiasis and other waterborne diseases prevalent in the area, the project also includes a number of public health components.

Borrower: Republic of the Philippines.

Terms: $15.0 million equivalent from Ordinary Capital resources. Term of 30 years at 8.9 percent interest per annum. Total project cost: $40.4 million equivalent.

Purpose & Benefits: The economic benefits expected from this project are substantial. At full development, incremental production of paddy is estimated at 122,000 m.t. annually which should save the Philippines about $17 million (equivalent) yearly in foreign exchange expenditures. About 5,670 families in the project area are to benefit in terms of increased farm income (from $315 to $1,818 equivalent annually for an average sized, 2 ha., farm) with additional employment of 3.9 million man-days per year for agriculture production when the project is in full operation and about 4.4 million man-days of job opportunities for non- or semi-skilled laborers during the five-year project construction period. The economic rate of return is estimated at 19 percent. In addition to the quantifiable benefits, there will be significant benefits from the improvement in public health conditions and the more equitable distribution of income.

Date Approved: December 7, 1976 (ADB)

POWER: This loan will help finance a portion of the Philippine National Power Corporation (NPC) power development program for the island of Mindanao. The objective is to produce annual energy output of 870 GWh. from generating capacity of 150 MW. (3 x 50 MW.) at the Agus 4 site by 1982. The main features of this project include a rockfill dam, gated overflow spillway, low level outlet, an underground power station with associated water conductors and electro-mechanical equipment and transmission facilities. A reservoir covering about 272 ha. is to be created. A double circuit 2.4 km. 138 kV. transmission line is to convey the power generated to the Abaga substation for feeding into the Mindanao Grid. The project will also help finance prefeasibility studies on hydropower projects for two other river basins in Mindanao and provide for the strengthening and expansion of NPC's design and engineering capabilities.

Borrower: The Philippine National Power Corporation (NPC).

Terms: $52.0 million equivalent from the ADB's Ordinary Capital resources. Term of 25 years at 8.9 percent interest per annum. Total project cost: $106.4 million equivalent.

Purpose & Benefits: This project is a vital segment in the development of the Mindanao power sector. The economic rate of return for the project is estimated at 20 percent, based on power tariffs expected to be in force in 1982 when the project commences full operation. In addition to quantified benefits, the project will assist in the industrial development of the region by making available economic hydropower. It will also save foreign exchange by eliminating the need for the oil-fired generating capacity which would be required without the project, and will increase direct and indirect employment opportunities.

Date Approved: December 21, 1976 (ADB)

SOLOMON ISLANDS

AGRICULTURE: The major components of the project to be financed with this ADB loan are the importation of 2,000 head of cattle, development of smallholder cattle farms including pasture areas and breeding farms. The organization of cattle holding grounds, establishment and operation of slaughtering and processing facilities, and development of domestic and foreign marketing channels. In addition, extension services and training facilities are to be strengthened and such services as credit, inspection and consulting facilities will be financed.

Borrower: Government of the Solomon Islands.

Terms: $3.6 million equivalent from ADB Special Funds resources. Term of 40 years with a 1 percent service charge per annum. Total project cost: $8.4 million equivalent.

Purpose & Benefits: The Solomon Islands have natural climatic, soil and land conditions for beef cattle development. Until recently local meat consumption needs were met mainly through imports of canned and frozen meat. The Government recognizes the potential for livestock development, however, and places high priority on this sector in its National Development Plan. The Plan's objectives are to replace imported meat with local products and lay the foundation for a beef export industry in the future so as to expand internal economic activity and increase cash incomes. The beef cattle development program aims at increasing the national beef cattle herd from about 24,000 at the present time to about 52,000 by 1985. The project is expected to provide positive balance of payments effects through exports ($1.2 million equivalent annually) and import substitution ($0.5 million equivalent annually). About 600 permanent jobs will be created directly and the increase in unpaid family labor will be approximately 250 man-years. In addition, some paid employment will be generated in the meat processing and retail sectors. The estimated economic rate of return for the project is 12 percent.

Date Approved: December 21, 1976 (ADB)

SRI LANKA

DEVELOPMENT FINANCE COMPANY: The proceeds of this loan will augment the foreign exchange availabilities of the Development Finance Corporation of Ceylon (DFCC), enabling it to make sub-loans to private sector industrial enterprises (including small-scale industries) and to agriculture-related businesses. DFCC is the only industrial development financing institution in Sri Lanka and provides medium- and long-term credits in local and foreign currencies to private sector enterprises. It also provides capital in the form of share participation, and renders managerial, technical and administrative services.

Borrower: The Republic of Sri Lanka.

Terms: $5.0 million equivalent from Special Funds resources. Term of 40 years with a 1 percent service charge per annum.

Purpose & Benefits: The DFCC expects a substantial increase in its foreign exchange lending beginning in 1977. According to recent estimates DFCC's foreign exchange needs to March 1979, including the backlog of approvals from 1976 and 1977, amount to about $19.6 million. This ADB loan of $5 million will meet part of this need. Other lenders, such as IDA, are also considering loans to the DFCC.

Date Approved: December 21, 1976 (ADB)

WESTERN SAMOA

DEVELOPMENT FINANCE COMPANY: These loan funds will augment the foreign exchange resources available to the Development Bank of Western Samoa (DBWS) for meeting the medium- and long-term credit requirements of entrepreneurs undertaking development-oriented projects in Western Samoa.

Borrower: Western Samoa.

Terms: $3.0 million equivalent from ADB Special Funds. Term of 40 years with a 1 percent service charge per annum.

Purpose & Benefits: The tentative sectoral allocation for sub-loans using these resources is as follows: industry—60 percent; agriculture—15 percent; and group/village projects—25 percent. The first five loans in excess of $40,000 are to be submitted to the ADB for prior approval. The maximum loan to a single enterprise will be 20 percent of DBWS' total unimpaired capital and reserve funds. The Western Samoan Government is to assume the foreign exchange risk with respect to loan repayments. It reserves the right, however, to pass this risk on to sub-borrowers in cases where the sub-loan exceeds $200,000. The standard debt/equity ratio for borrowers will remain at 3:1. DBWS' lending rate under the proposed loan is to be at least 9 percent for industrial loans, and at least 8 percent for agricultural and group/village loans.

Date Approved: December 16, 1976 (ADB)

AFRICAN DEVELOPMENT FUND

BENIN

HEALTH: This project comprises: (a) the construction of four new health centers and the improvement of six others in rural areas; (b) improvement of twenty dispensaries attached to the health centers to provide quality child-birth and pre- and post-natal care services; (c) reorganization of the Parakou Nursing School for teaching various subjects to such personnel as assistant nurses, sewerage technicians, and dental and medical assistants; (d) equipment for the health centers, dispensaries and the Parakou School and Parakou Hospital; (e) provision of technical assistance for staff training and consultant services for architectural design and supervision of construction works.

Borrower: People's Republic of Benin.

Terms: $5.5 million equivalent African Development Fund credit. Term of 30 years with a service charge of 0.75 percent per annum. Total project cost: $6.2 million equivalent.

Purpose & Benefits: This project is part of a broader program aimed at improving the quality and hygiene of rural health services in Benin by reinforcing the existing, and creating new facilities such as rural health units and training programs situated close to the areas in which the end-users and recipients reside. Evacuations to hospitals for minor reasons will be reduced as a result of the new facilities and long journeys, harmful to the sick and unpleasant for family, will be eliminated. The project also involves training health teams in various disciplines to serve the needs of the rural population. Among the results expected from this project are lower mortality, reduced expenditures on curative care, and the return of people to areas affected by rural depopulation which will, in turn, promote the revival of agricultural production.

Date Approved: June 27, 1977 (AFDF)

ETHIOPIA

IRRIGATION: This loan will help finance a project to develop a gravity irrigation system for 7,500 ha. in the Middle Awash Valley. Of this, 6,700 ha. will be developed as a State farm for producing cotton and the remaining 800 ha. will be developed as a settlement farm for cultivating cotton, corn and beans. Existing developed land area of about 2,800 ha. already under pumped irrigation is to be converted to a gravity system as well.

Borrower: Ethiopia.

Terms: $5.5 million equivalent African Development Fund credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $44.0 million equivalent.

Purpose & Benefits: The major benefits of this project will be incremental output of cotton, corn and beans, improved employment opportunities for the rural population of the area, and foreign exchange earnings from cotton exports. The prospects for exporting other high value agricultural products are also evident. The overall economic rate of return for the project over 50 years is estimated at 13.0 percent. The settlement project will provide land for about 320 farmers and their families who, in addition to the family labor employed, will hire seasonal labor for cotton picking. At full project development, it is estimated that regular employment for about 3,500 farm workers and seasonal employment (three months annually) for about 7,500 workers will be created by the settlement, the research station and the State farm. During the construction period, up to 750 workers will be employed in building project infrastructure. The direct beneficiaries of the project will be the settlers and the wage earners on the State farm. For the settlers, per capita income for a family of five is expected to rise from an average in the area of about Birr 60 to Birr 422 at full development. For fully-employed wage earners, assuming 250 working days per year, annual income is expected to be about Birr 500 and for the seasonal workers Birr 200. These incomes are to accrue to the currently under-employed workers from the highlands as well as to some Afars from the river valley whose incomes are at subsistence levels.

Date Approved: February 21, 1977 (AFDF)

LESOTHO

WATER SUPPLY: This project consists of the following principal components: (a) a raw water storage reservoir and intake; (b) extensions of the existing distribution network incorporating new service reservoirs and pumping installations; and (c) extensions to the existing treatment works.

Borrower: Kingdom of Lesotho.

Terms: $6.3 million equivalent African Development Fund credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $6.97 million equivalent.

Purpose & Benefits: The urban fringe areas of Maseru are not now served completely by the existing water supply system. Some areas have distribution mains, but no water can be provided because of supply limitations. As Maseru expands, however, the areas not served with piped water will increase, as will also attendant health hazards. The increased risk of water-borne disease after 1979 will also apply to the population currently being served by the existing water supply system since reduced pressure could easily lead to back-siphoning of used water into the drinking water system. This project, together with improvements in the water-borne sewerage system, can therefore be expected to contribute to holding the number of cases of water-borne diseases to the current low level. In addition to the positive health implications, this will also lead to substantial private and public savings on medical expenses. Improved health due to better quality water and adequate supplies can be expected to increase the pro-

LESOTHO—Continued

ductivity of labor and reduce absenteeism. An uninterrupted supply of water, even during dry periods, will also help eliminate an important obstacle to future industrial development in the Maseru area.

Date Approved: June 27, 1977 (AFDF)

MADAGASCAR

TRANSPORTATION: This project consists of: (a) building a 71 km. two-lane road between Bealanana and Antsahable in the Ankaizine region of northern Madagascar, and (b) consultancy services for construction supervision.

Borrower: Democratic Republic of Madagascar.

Terms: $4.1 million equivalent African Development Fund credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $15.1 million equivalent.

Purpose & Benefits: Traffic along the existing road comprises both passenger and commercial vehicles, with the latter accounting for about 47 percent of total volume. Annual average traffic during the first year of operation of the new road is expected to approach 102,000 vehicles and thereafter, at an annual rate of increase of 7 percent, to reach 366,280 vehicles by the end of the 1990's. These estimates include a 20 percent induced-traffic factor as a result of the development impact of the new road. Traffic is expected to consist of 47 percent of heavy trucks for the evacuation of agricultural products, 21 percent passenger cars, 21 percent passenger buses, and 12 percent light commercial vehicles. The quantifiable benefits of the project include savings in vehicle operating costs, savings in road maintenance costs, avoided vehicle operating costs and road maintenance costs on 10 km. of earth track, and economized travel time (the new road is expected to reduce overall travel time by two hours). Total net benefits are estimated at approximately $1 million equivalent during the first year the road is in operation and are expected to rise to approximately $3.5 million equivalent annually by the end of the 1990's. The internal rate of return for the project is estimated at 12 percent.

Date Approved: March 4, 1977 (AFDF)

MALI

RURAL DEVELOPMENT: The major components of this project include: (a) increases in cotton, rice, and kenaf plantings by approximately 32,000 ha.; (b) technical assistance to individual farmers and the establishment of agricultural research stations to concentrate on seed production, planting techniques, fertilizer application, and animal husbandry; (c) rehabilitation of an existing 10,000 ton capacity ginnery and construction of a new 20,000 ton ginnery; (d) construction of a new rice mill with a processing capacity of 10,000 tons of paddy rice annually; (e) staff housing, retail commercial facilities, offices and garages; (f) establishment and support of four road maintenance teams; (g) provision of vehicles and equipment; (h) farm credit to assist individual farmer purchases of agricultural inputs; (i) a livestock program; and (j) provision of medical supplies to rural dispensaries and medical training.

Borrower: Republic of Mali.

Terms: $5.9 million equivalent African Development Fund credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $42.4 million equivalent.

Purpose & Benefits: This project is expected to lead to increased annual production of 43,000 tons of cotton, 2,100 tons of kenaf, 7,300 tons of corn, and 6,600 tons of paddy rice by 1981. Currently, 85 percent of Mali's cotton production is exported. Foreign exchange earnings are expected to increase by nearly $12 million equivalent annually by 1980 as a result of this project. Incremental production of other commodities will be used to meet domestic requirements. The project will benefit 91,000 farm families in the form of higher incomes. The economic rate of return on the project is estimated at about 45 percent over a 20 year period.

Date Approved: April 29, 1977 (AFDF)

MOZAMBIQUE

TRANSPORTATION: This African Development Fund credit will help finance part of the cost of constructing the two-lane Nampevo-Alto-Moloque road (121 km.) and provide consultancy services for the preparation of tender documents and construction supervision.

Borrower: Mozambique.

Terms: $8.8 million equivalent African Development Fund credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $17.0 million equivalent.

Purpose & Benefits: Construction of this major artery and development of its planned rural feeders will stimulate the economic development of Mozambique's rural population and foster its integration into the mainstream of society. The project area (estimated population, 300,000) is the country's richest agricultural and cattle breeding region and is also an economically important mining area. In 1976 the area is estimated to have produced 18,000 tons of tea, 14,000 tons of corn, 6,000 tons of cotton, 5,000 tons of peanuts, and significant quantities of other agricultural commodities. Mineral resources include mica, tantalum, kaolin, beryllium and semi-precious stones and mining production is expected to reach 47,000 tons by 1980. The road will assist measurably in facilitating the evacuation of agricultural and mining products. Traffic on the existing road is approximately 220 vehicles per day (46 percent trucks, 22 percent buses, 20 percent passenger cars, and 12 percent light commercial vehicles). Average daily traffic will reach an estimated 313 by 1980 and is expected to grow thereafter at an annual rate of 7 percent, to reach 1,151 vehicles per day by 1999. (These estimates include a 40 percent induced-traffic factor.) Benefits from the project include savings in vehicle operating costs and avoided vehicle operating costs on 11 km. Total net benefits are estimated at about $5 million equivalent during the first year the road is open, reaching more than $20 million equivalent by 1999. The project internal rate of return is estimated at 35 percent.

Date Approved: April 29, 1977 (AFDF)

RWANDA

AGRICULTURE: This project is designed to develop 700 ha. of tea plantations in the Gisovu highlands of

Kibuye district. It is envisaged that 550 ha. of plantations will be developed on a small-scale farmer plantation basis and 150 ha. as State plantation. The project components include: (a) a 700 ha. tea plantation unit and a 320 ha. afforestation unit; (b) construction of a factory for processing tea on a commercial basis with a capacity of 1,200 ton/year; (c) construction of service roads; (d) construction of offices, shops, housing accommodation units and workshops, and (e) qualified expert services.

Borrower: Republic of Rwanda.

Terms: $5.3 million equivalent African Development Fund credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $6.1 million equivalent.

Purpose & Benefits: One of the principal benefits of this project will be in the form of increased foreign exchange earnings from tea exports. Assuming that 95 percent of this production will be exported, foreign exchange earnings after full production is reached should be more than $1 million equivalent annually. The estimated economic rate of return on the project is about 11 percent. The project also has several socio-economic benefits: some 1,800 family-cultivators now living at subsistence levels will enjoy greatly increased incomes. On the basis of 8 F. Rw/Kg. of green leaf and production of 1,190 kg/ha. of dry tea (5,355 kg. leaves), the overall net income to be distributed to farmers will be about 24,600,000 F. Rw/year salary to laborers working at the industrial unit and nearly 4.5 million F. Rw/year salaries for factory workers.

Date Approved: February 21, 1977 (AFDF)

SIERRA LEONE

EDUCATION: This project consists of: (a) construction of teaching facilities, hostels, a kitchen and dining hall, staff houses and a farm complex; (b) furniture and equipment; (c) assistance in the improvement of water and electric supplies; and (d) technical assistance and fellowships to strengthen teaching and administrative staff.

Borrower: Sierra Leone.

Terms: $5.5 million equivalent African Development Fund credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $6.6 million equivalent.

Purpose & Benefits: This project will support Government of Sierra Leone efforts to improve the quality and relevance of primary school education through the expansion and improvement of the Bunumbu Teachers College. The main emphasis will be on training teachers to introduce the new curriculum and act as leaders and coordinators of community activities in rural areas. The Bunumbu Teachers College, and the twenty pilot schools in the vicinity of the College, will serve as the first phase in the introduction and development of a new rurally-biased curriculum.

Date Approved: June 27, 1977 (AFDF)

SOMALIA

INDUSTRY: This is a project to expand Somalia's printing and publishing capacity to satisfy increased demand for educational materials, particularly for use in elementary, secondary and higher education institutions. The project consists of: (a) The acquisition of printing and related equipment; (b) construction of physical facilities to accommodate this equipment and storage space for consumable supplies and textbooks; and (c) three man-years of technical assistance.

Borrower: Somali Democratic Republic.

Terms: $1.65 million equivalent African Development Fund credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $1.9 million equivalent.

Purpose & Benefits: This project is aimed principally at achieving high priority socio-economic needs: (a) consolidation of the national language and the new orthography as an essential tool in basic education and mass communication; (b) ensuring national standards of quality and consistency in all academic, cultural and educational published material; (c) providing the educational authorities with physical production capacity to satisfy growing demand for all forms of publications; and (d) meeting the educational authorities' dual mandate of producing mass circulation material and high quality, limited circulation material. Providing this printing capacity to the Ministry of Education should ensure that educational materials will not be delayed by other priorities. In addition, the associated technical assistance in the forms of expert services and training for national cadres will permit overall improvement in the quality and quantity of the printed material produced. The project will also contribute to the balance of payments since most of the printed material for schools is now imported. Savings in foreign exchange are expected to amount to an average of $2 million equivalent annually.

Date Approved: June 4, 1977 (AFDF)

TRANSPORTATION: These African Development Fund Credit resources will help finance construction of approximately 132 km. of all-weather roads, feasibility studies for an additional 380 km. of roads, and technical assistance to strengthen the Civil Engineering Department of the Ministry of Public Works. Road construction includes: (a) construction of the Hargeisa-Boroma road (approximately 113 km.) and a link road from Nabadid to Tug Wajale (approximately 19 km.); and (b) feasibility and detailed engineering studies of the Dinsor-Bardera-Gelib road (approximately 380 km.).

Borrower: Somali Democratic Republic.

Terms: $5.5 million equivalent African Development Fund credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $30.0 million equivalent.

Purpose & Benefits: In 1974 traffic volume along the route to be upgraded was approximately 72 vehicles daily. With an annual growth rate projected at 5 percent, traffic is expected to reach 92 vehicles per day in 1979 (prior to completion of the new road). Traffic consists of 41 percent land rovers, 53 percent trucks, and 6 percent buses. From the time of completion of the new road, it is conservatively estimated that traffic will increase 5 percent annually during the first ten years and 4 percent thereafter. Economic benefits from the project are expected to arise from savings in vehicle operating costs and savings in loss of weight and injury to animals. Estimated net benefits from savings in vehicle operating costs are expected to equal $0.6 million equivalent in the first year of the project, rising thereafter in proportion to increased traffic volume. It

Somalia—Continued

is estimated that 500,000 sheep and goats and 72,000 cattle will also be driven to Hargeisa during the first year the new road is open. Net additional income generated by the new transportation system for livestock is estimated at about $2.6 million equivalent in the first year of the project, increasing by 4 percent annually thereafter. Most of these increased earnings will be in the form of foreign exchange from the export of livestock. The economic rate of return for the project is estimated at 18 percent.

Date Approved: June 6, 1977 (AFDF).

TANZANIA

TRANSPORTATION: This project comprises: (a) construction to two-lane standards of the Rusumo-Lusahunga road (93 km.) linking the West Lake Region of Tanzania to Rwanda and (b) consultancy services for construction supervision.

Borrower: United Republic of Tanzania.

Terms: $8.8 million equivalent African Development Fund credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $12.0 million equivalent.

Purpose & Benefits: The direct benefits of this project will be savings in vehicle operating costs, avoided vehicle operating costs on 57 km. of earth track and savings in travel time. In estimating the benefits of the project a conservative approach was used by reducing traffic forecasts by one half. On this basis, total net benefits are estimated at about $38 million equivalent during the first year the road is open to traffic. If Rwanda's transit traffic is included, the internal rate of return on the project is about 73 percent. This high rate of return stems from the substantial savings by heavy trucks which constitute a high percentage (74 percent) of total traffic. Construction of the road will also help monetize the rural economy of Tanzania's West Lake Region and greater social and economic interaction will be afforded to villages in the project area.

Date Approved: February 21, 1977 (AFDF)

UPPER VOLTA

RURAL DEVELOPMENT: This project consists of: (a) technical assistance for the newly established Ministry of Rural Development (MRD); (b) technical assistance for two regional development offices; (c) construction of a 22,000 ton cotton gin; and (d) provision of seed, fertilizer and pesticides to individual farmers.

Borrower: Republic of Upper Volta.

Terms: $5.5 million equivalent African Development Fund credit. Term of 50 years with a service charge of 0.75 percent per annum. Total project cost: $17.0 million equivalent.

Purpose & Benefits: A major objective of this project is the strengthening of the administrative and technical capabilities of several Upper Voltan government agencies by means of intensified training programs and the provision of technical assistance. Specific components include: (a) assignment of expatriate technical experts to work in the MRD; (b) organization and staffing of a financial and administrative unit to assist regional development institutions in the preparation of budgets, requisitions for agricultural supplies, and financing and disbursement requests; (c) establishment and staffing of regional agricultural extension service departments to upgrade services provided to individual farmers; (d) a training center to process 400 trainees annually; (e) an improved seed distribution system; (f) construction of a 22,000 ton capacity gin to handle incremental cotton production from the project; (g) irrigation of 1,120 ha. to permit production of rice, corn, and vegetables; and (h) a program to improve the situation of women through the introduction of home and farm labor-saving devices, basic instruction in nutrition and sanitation, and a functional literacy program. It is estimated that the added annual production stemming from the project will comprise 26,000 tons of cotton, 39,000 tons of cereals, 2,000 tons of rice, and 1,200 tons of vegetables. Some 46,500 farm families are to benefit in the form of increased income. Earnings from increased exports are estimated at about $6.5 million equivalent annually after the project is in full operation. The economic rate of return for the project is estimated at 34 percent.

Date Approved: April 29, 1977 (AFDF)

(*NOTE:* The loan descriptions in this African Development Fund section of this appendix pertain only to those AFDF credits reviewed and authorized subsequent to the United States becoming a member of the AFDF in mid-November 1976. The data in Table C-1 above, however, cover all AFDF credits authorized during the period covered by this Annual Report of the NAC).

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STATISTICAL APPENDIX

SECTION A.–U.S. Balance of Payments

TABLE A–1.—*U.S. balance of payments, 1976–1977*

[Millions of dollars]

	Fiscal 1976	T.Q.	Fiscal 1977 I	Fiscal 1977 II	Fiscal 1977 III
Current Account Transactions:					
Merchandise trade, balance of payments basis,[1] net	1199	−2808	−3594	−7103	−7859
Exports	(109653)	(29603)	(29711)	(29458)	(30488)
Imports	(−108454)	(−32411)	(−33305)	(−36561)	(−38347)
Military transactions, excl. grants, net	−272	235	235	516	464
Deliveries under sales contracts	(4410)	(1472)	(1457)	(1845)	(1867)
Expenditures	(−4682)	(−1237)	(−1222)	(−1329)	(−1403)
Travel, excl. transocean fares, net	−1280	−216	−334	−427	−292
Receipts	(5377)	(1494)	(1477)	(1426)	(1534)
Payments	(−6657)	(−1710)	(−1811)	(−1853)	(−1826)
Other services, excl. investment income, net	3737	997	932	767	921
Receipts	(15220)	(4144)	(4177)	(4212)	(4473)
Payments	(−11483)	(−3147)	(−3245)	(−3445)	(−3552)
Investment income, net	7837	2667	2424	3252	3401
Receipts on U.S. assets abroad	(19114)	(5483)	(5421)	(6133)	(6565)
Payments on foreign assets in the U.S.	(−11277)	(−2816)	(−2997)	(−2881)	(−3164)
Private remittances and government transfers other than grants	−1831	−461	−473	−526	−505
Government economic grants	−2519	−1475	−572	−637	−735
Balance on current account transactions	6873	−1061	−1382	−4158	−4605
Capital Account Transactions:					
U.S. assets abroad, net (acquisitions (−)/ liquidations (+))	−35447	−8409	−14022	331	−11774
U.S. official reserve assets	−2604	−407	228	−388	6
Other U.S. Government assets	−3391	−1405	−1142	−909	−827
U.S. private assets	−29453	−6597	−13108	1627	−10952
Direct investments	−4348	−1205	−822	−404	−2602
Foreign securities	−7141	−2743	−2171	−692	−1746
Other assets reported by U.S. nonbanking concerns	−3646	723	−967	−722	−1179
Other claims reported by U.S. banks	−14319	−3372	−9148	3446	−5426

See footnotes at end of table.

TABLE A–1.—*U.S. balance of payments, 1976–1977*—Continued

[Millions of dollars]

	Fiscal 1976	T.Q.	Fiscal 1977		
			I	II	III
Foreign assets in the U.S., net (acquisitions (+)/ liquidations (—))	22471	8201	12079	2510	12991
Foreign official assets[2]	9127	3070	6977	5719	6935
Industrial countries	—3282	—342	4909	2164	5068
OPEC members	11134	1774	805	3249	824
Other countries	1275	1638	1263	306	1043
Other foreign assets	13343	5131	5102	—3209	6056
Direct investments	2008	561	403	537	486
U.S. Treasury securities	2133	3026	—88	1047	—1273
Other U.S. securities	2936	68	21	879	820
Other liabilities reported by U.S. nonbanking concerns	—259	—297	—242	—374	—298
Other liabilities reported by U.S. banks	6525	1774	5008	—5298	6321
Balance on capital account transactions	—12976	—208	—1943	2841	1217
Statistical discrepancy	6104	1268	3325	1317	3388

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[1] The figures for merchandise trade included in balance of payments compilations are based on data collected by the Bureau of the Census, but are adjusted for coverage and timing. The balance of payments figures also exclude exports and imports by U.S. defense agencies which are included in military transactions.

[2] Including claims representing prepayments on military and other U.S. Government sales contracts.

Source: "Survey of Current Business" June and September 1977, published by U.S. Department of Commerce, Bureau of Economic Analysis.

SECTION B.—Statistical Tables on U.S. Government Foreign Grants, Credits, and Other Assistance

Explanatory Note

The statistical tables, and this Explanatory Note, were prepared by the Bureau of Economic Analysis, Department of Commerce, in consultation with the National Advisory Council Secretariat, in accordance with specifications of the National Advisory Council. This presentation continues that formerly published in more detail by the Bureau of Economic Analysis, in "Foreign Aid by the United States Government, 1940–1951," a 1952 supplement to the *Survey of Current Business*, and in the periodic report *Foreign Grants and Credits by the United States Government.*

The tables are compiled by the Bureau of Economic Analysis from information made available by agencies operating the grant, credit, and other assistance programs, and include some estimates for transactions not yet recorded on the operating agencies' books.

Items which are based on estimates have been adjusted or qualified on the basis of information received to the date of preparation of these tables, but in some instances are subject to future adjustments.

The data on credits included in this *Report* are comparable, with minor exceptions, to those appearing in *Foreign Credits by the United States Government*, a semiannual publication of the Department of the Treasury, in which a detailed enumeration of every active foreign credit of the U.S. Government, showing its current status, is presented.

Transactions included.—The data tabulated in this appendix are divided into three categories—grants, credits, and other assistance through net accumulation of foreign currency claims under programs for the sale of agricultural commodities. The Government's capital investments in, or contributions to, the international financial institutions constitute an additional measure taken by this Government to promote economic recovery and development.

Payments to the *international financial institutions* do not result in immediate equivalent aid to foreign countries. Use of available dollar funds is largely determined by the managements of the institutions, in some instances subject to certain controls which can be exercised by the U.S. Government. Changes in the procedures for disbursing the U.S. Government contributions, initiated in 1965, have retarded such actual Government payments to agree more closely with the actual disbursement of assistance by the international institution to the foreign country.

Grants are transfers for which no payment is expected,[1] or which at most involve an obligation on the part of the receiver to extend aid to the United States or other countries to achieve a common objective. *Credits* are loan disbursements or transfers under other agreements which give rise to specific obligations to repay, over a period of years, usually with interest. *Other assistance* represents the transfer of U.S. farm products in exchange for foreign currencies (*plus*—since the enactment of Public Law 87–128—principal and interest collections in foreign currencies for credits extended under the farm products sales program) *less* the Government's disbursements of the currencies as grants, credits, or for purchases. The net acquisition of currencies represents net transfers of resources to foreign countries under the agricultural programs, in addition to those classified as grants or credits. Detailed descriptions of the types of transactions included in these categories are given in the Explanatory Note to the statistical appendix of the *Report* of the National Advisory Council for January–June 1960.[2] Additions to and changes in these descriptions are given below.

A distinction is made in these tables between *military grants* and *other grants*. Generally, this classification is made from the underlying legislative authorizations under which the assistance is provided, classifying as military those programs that were enacted to furnish military supplies or services to foreign countries. In addition to obvious delivery of military supplies and concomitant services, cash payments to provide for the purchase of such military-end items—both from the military services and from commercial sources—are also included as military grants. On the other hand, aid provided as "defense support" or "security supporting assistance"—even when intended to provide support to a beneficiary in its budget maintenance of its military force—is included in the *other grants* category. No distinction is made between military and other credits.

Occasionally, assistance has been given under indeterminate conditions subject to future settlement. Indeterminate aid on this basis is included with grants, in the period rendered. When settlement for such indeterminate aid is agreed upon, the terms may call for a cash settlement or may establish a long-term credit. Cash settlements are included in returned grants. Amounts of the newly established credits are added to outstanding indebtedness.

The term *assistance* is applied as a concise label to the aggregation of transactions reported on in this section. Most of these transactions were authorized under legislation specifically intended to provide foreign *aid*, or foreign *assistance*, through grants or long-term credits with low interest rates. However, other transactions were authorized under legislation intended to promote export trade by providing credit support to foreign economies on relatively hard, commercial, *nonconcessional* terms. One significant "commercial" program is that of the Commodity Credit Corporation.

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[1] In many instances, a limited percentage of the counterpart funds (the commensurate foreign currency value), or of the foreign currency proceeds resulting from the distribution of goods through commercial channels in the foreign country, is required to be made available to the U.S. Government.

[2] H. Doc. No. [illegible]54, 87th Cong., 1st sess.

The U.S. Government receives some returns on its gross grants and credits. The returns which are deducted from gross grants and credits to arrive at net grants and credits include (1) reverse lend-lease; (2) the dollar value of the portion of grant counterpart funds paid to the United States for its use; (3) returned lend-lease and civilian supply ships; (4) returns of military equipment "loaned"; (5) cash received in war-account settlements for lend-lease and other aid; and (6) principal repaid on credits, but not interest. The Government's disbursements of currencies are deducted from the accumulation of currency claims in calculating net other assistance.

Interest collected on the credits extended by the U.S. Government is tabulated separately in this *Report*. The data on interest shown in this *Report* do *not* include the interest collected on accumulated foreign currencies on deposit abroad.

Tables B–1 through B–5, B–6, and B–12 emphasize the net amounts of grants, credits, and other assistance. Gross grants, gross credits, and deliveries under farm products sales are shown separately in *Tables B–1, B–2, B–5A, and B–12* for the convenience of those who desire to measure the utilization of the legislative authorizations for aid.

Repayments of principal and interest collections are also shown in *Tables B–1, B–5B, B–10, and B–11*. Over short periods of time, such as 1 year, the total of gross grants, gross credits, and *net* other assistance is an effective statistical tool, but for longer periods the addition of the three categories introduces further conceptual difficulties, particularly where revolving authorizations (such as for Export-Import Bank loans) are involved.

Comparable data: Balance of payments.—The total amount for Government capital contributions to international financial organizations, grants, credits, and other assistance in this section is not identical with the amount shown for Government grants and capital in the balance-of-payments accounts in *Table A–1* of this *Report*. The main factors contributing to this difference are: (1) Contributions to the multilateral-construction program of the North Atlantic Treaty Organization are included as military grants in this section, but are shown only as military expenditures in the balance of payments, and (2a) Government investments in certain productive facilities abroad, (2b) Government receipts on funded claims, and (2c) net changes in foreign currency holdings resulting from transactions other than those under the farm products programs are included in U.S. Government capital in the balance-of-payments statements but not in this section (see *Exclusions*, below.) The balance-of-payments statistics on U.S. Government capital movements also include changes in other short-term assets—accounts receivable and short-term credits up to and including 1 year—which are excluded from data in this section.

There is some difference in classification of transactions which are incorporated into both the balance-of-payments statistics and in this section. *Grants financing military purchases* are not included in military unilateral transfers, but in other unilateral transfers, in the balance-of-payments account; such expenditures are included in *military grants* in this section.

Entries in balance-of-payments accounts for interest collected by the U.S. Government include, in addition to the data reported in *Table B–11*, income on Government investment in certain productive facilities abroad, on foreign currency and U.S. dollar balances held in foreign depositaries, and on the U.S. Government holdings of special drawing rights (the latter being recorded net of payments of charges on the allocation of special drawing rights). The balance-of-payments accounts also include the net gain or loss on U.S. reserve foreign currency transactions.

Comparable data: International investment position.—The total amount for outstanding indebtedness of foreign countries on U.S. Government credits shown in this section is not identical with the entry for nonreserve assets of the U.S. Government in articles entitled "International Investment Position of the United States" that are published annually by the Bureau of Economic Analysis in its *Survey of Current Business*. "U.S. loans and other long-term assets" in the annual article includes—in addition to the data from *Table B–8* of this *Report* and the accumulation of the Government capital contributions to international financial organizations (from *Table B–1*)—the cumulative asset position of certain funded claims and Government investments in productive facilities abroad.

Dollar equivalents.—The measure of foreign grants and credits generally is in terms of (1) dollars disbursed by the U.S. Government to or for the account of a foreign government or other foreign entity or individual, (2) dollar equivalents of goods delivered or shipped, services rendered, or foreign currencies disbursed to or for such foreign account, and (3) the dollar equivalent of interest capitalized and of outstanding principal that is refinanced. Correspondingly, returns are measured in terms of the dollars received by the U.S. Government, or the dollar equivalents of goods, services, and foreign currencies received. Dollar equivalents are, of necessity, frequently estimated.

Equivalents on credits.—Utilizations and collections of principal and interest include those in U.S. dollars, other currencies, materials, and services. The medium of exchange of one transaction on a credit (such as utilization by disbursement) does not determine the medium of exchange of another (such as interest collections). Because of the variety of these media of exchange, meaningful interprogram, intraprogram, and intercountry comparability of the data is achieved through the use of dollar equivalents for all transactions not in U.S. dollars, statistically calculated upon procedures outlined in applicable Office of Management and Budget and Treasury Department regulations.

To reflect the significant part of the foreign indebtedness to the U.S. Government on credits that is repayable in foreign currencies, two supplemental tables (*B–8A and B–8B*) are included in this *Report.* They separate the total outstanding indebtedness amounts shown in *Table B–8* into the two categories "Repayable in U.S. dollars" (at the option of the U.S. Government) or "Repayable in foreign currencies" (at the option of the debtor).

Fiscal data.—The measure of grants and credits shown here—transfers—is not fiscal data. It is the same as *budget expenditures* only when dollars are disbursed as direct assistance. Expenditures in payment of the goods or services often occur before or after the actual transfers recorded here. The amounts of transfers are sometimes estimated from data on expenditures or (for services rendered) from fiscal data on *obligations.* Values of commodities transferred from Commodity Credit Corporation (CCC) stocks are frequently estimated at current export offering price, *not* at CCC cost (see paragraph 5 in the section *Grant, credit, and other transactions covered,* below).

Periods covered.—Revised summary data for the entire postwar period (July 1, 1945,[2] through December 31, 1976) are included in *Table B–1. Tables B–2 through B–6 and B–11* present data for the first 25½ postwar years, July 1, 1945, through December 31, 1970, in total, and annually for each subsequent calendar year. Revised data on credit activity for the entire postwar period are given in *Tables B–7 and B–10. Table B–12* presents data on other assistance (through the farm products sale programs) for the postwar period.

In preparing the section tables, data collected from reporting agencies have been adjusted in some instances to place in the proper period transactions which supplemental data have shown actually occurred other than in the period in which reported. However, such changes have generally been made only when the adjustments appeared sufficiently large to be significant.

Geographical presentation.—Assistance is shown by country, or general area, where possible. In certain instances (particularly in the earlier postwar period), data for parent countries include those for their dependent area; for example, although goods have been shipped to a then dependent area, Tunisia, such aid was reported as rendered to the parent country, France. Data for Japan include transactions for the Ryukyu Islands, shown separately in *Reports* prior to the agreement with Japan concerning reversion of the Ryukyu Islands that entered into force May 15, 1972.

Transactions shown for a country are *not* necessarily with the government of such country, but are often with individuals, relief organizations, multinational organizations, or other private entities located in the designated country and considered to be within its economy. Thus, for example, net credits for Canada include loans to Canadian Pacific, Ltd., and the net grants for Hungary include relief commodities donated to the League of Red Cross Societies for distribution to individuals.

The area *Western Hemisphere,* for which totals are shown in all geographical tables, excludes Canada; and data for Canada are always shown separately.

Because most data for the major military aid programs were available for publication only in the groupings established by the Mutual Security Act of 1954, Public Law 83–665, as amended, country detail is generally not shown for any military grants except in *Table B–1.* These data are included in the respective geographical areas except that military grant aid to Near East (including Greece and Turkey) and South Asia is included in *Western Europe* and military grant aid to New Zealand is included in *Asia* in *Tables B–3 and B–4.* The military aid for which data are not available by area is shown as *Unspecified, all areas.*

Data specially compiled and released by the Defense Department have been used in compiling *Table B–1,* as indicated in footnote 3 thereto. These data are not exactly equivalent to the amounts reported by the Defense Department for inclusion by geographical area in these tables. Where country data were not available, the data are included by area as indicated in the preceding paragraph. *Tables B–3 and B–4* include detail for military grants only for the areas, as indicated in the preceding paragraph.

Where country detail is not available the data are shown if possible by area as *Unspecified,* for a named area, otherwise as *Unspecified, all areas.*

Transactions excluded.—In addition to the U.S. Government grant programs included in this section, there are several operations of the Government abroad which are sometimes called grants or assistance, but are not included in these tables. Details of, and elaboration on, many of these grant exclusions are given on pages 37–38 of the *Report* for January–June 1960.[3] Some changes in exclusions since the earlier *Report* are set out in the section *Grant, credit, and other transactions covered,* below.

Several types of transactions represent value received *by* the U.S. Government but are not included in the returns data. No cognizance of advances to the U.S. Government has been taken in the derivation of net credits.

Transactions on "World War I indebtedness," including those arising from disbursements under the Liberty Bond Acts in 1929, are excluded from the tables in this section.

The U.S. Government frequently settles claims on its behalf for financial consequences of the actions of another government (such as in the agreement with France entered into June 12, 1975), or settles claims espoused on behalf of U.S. nationals for property, rights, and interest affected by nationalization or expropriation (such as in the agreement with Egypt entered into May 1, 1976). Although the U.S. Government often receives single settlement collections or agrees to accept deferred collection on what becomes *funded claims*, the transactions are excluded from the tables in this section.

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[2] For lend-lease, surplus property, and grant settlements, the postwar period is calculated from V–J Day (Sept. 2, 1945).

[3] H. Doc. No. 154, 87th Cong., 1st sess.

Transactions involving relatively *short-term* foreign indebtedness to the U.S. Government are excluded from the tables, among which are the following significant categories.

1. Some transactions under the Commodity Credit Corporation export credit sales program, such as those reported in *Table M–3* of the statistical appendix, are excluded from the tables in this section, to the extent they represent receivables originally scheduled to mature in 1 year or less. The *Annual Report of Financial Condition and Operations* of the Commodity Credit Corporation shows "Accounts and Notes Receivable, due from foreign importers under export credit sales program." The Corporation has reported this amount, as of December 31, 1976, at $999 million, of which $76 million represented receivables originally scheduled to mature in 1 year or less. The export credit sales program claims scheduled to mature in periods in excess of 1 year are included in the data in this *Report* (see paragraph 16 in the section *Grant, credit, and other transactions covered*, below).

2. Short-term credits and other receivables originally scheduled to mature in 1 year or less and extended under the provisions of the Arms Export Control Act (sections 21 and 22) are excluded from the tables in this section.

3. Transactions of the U.S. Exchange Stabilization Fund under exchange agreements are also excluded from the tables in this section.

4. Accounts receivable on international postal accounts, pending settlement by offset or collection, and accounts receivable from other governments for their shares of operations of the international ice patrol under the International Convention for the Safety of Life at Sea (Treaties and Other International Acts Series 3597) are excluded from this section.

Transactions with international financial institutions covered.—The U.S. Government has made equity capital investments in international financial institutions which provide development and other longer term economic assistance to foreign countries.

Payments of the U.S. quota in the International Monetary Fund are the primary basis for calculating the net asset position of the United States in the Fund. Such asset is considered to be a monetary reserve asset held with the Fund and, thus, the U.S. investments in the Fund are *not* included in the figures in this section. The Fund provides general financial assistance of relatively short term to all of its members, and the United States itself drew from the Fund in 1964–67; all these drawings were settled by the end of 1968. The United States again drew from the Fund in 1970–72; all of these drawings were settled by March 1975.

No attempt has been made in these tables to allocate to foreign countries the assistance rendered through these international financial organizations by use of U.S. Government investments. The U.S. Government has a larger equity investment in the paid-in capital of these institutions than any other government. Data on the operations of these international institutions are included in sections D through I of the statistical appendix.

Specifically, the international financial institution investments that are included in this section of the appendix are those in the three international financial institutions in the World Bank Group—the Bank itself, and the International Development Association (IDA) and the International Finance Corporation (IFC)—and three regional institutions—the African Development Fund, the Asian Development Bank (ADB), and the Inter-American Development Bank (IDB)—as described in the following paragraphs. Technical assistance grants that have been made to these institutions are recorded in the category *Grants* and not in the figures on equity investment.

1. U.S. participation in the World Bank, the *International Bank for Reconstruction and Development* (IBRD), was authorized in Public Law 79–171 (the Bretton Woods Agreements Act). The authorized capital subscription was increased to $6,596 million by Public Law 91–599. The Congress appropriated $6,473 million to purchase these subscriptions.[4]

IBRD borrows much of the funds it lends by floating bond issues. The bulk of the Government subscription constitutes a guarantee of these bonds, and is callable by the IBRD to meet its obligations in the remote possibility of a drastic deterioration of the ability of the Bank's debtors to repay their borrowings. Of the total Government subscription, only 10 percent is paid-in capital to be used for operations, and the remainder may be called only to meet IBRD obligations on securities it has issued or guarantees it has given. The Bank lends only to member governments or on loans guaranteed by member governments, central banks, or comparable agencies of the member government.

2. Public Law 86–565 authorized an initial U.S. subscription of $320 million to the *International Development Association;* the purpose of IDA is to promote the economic development of less-developed member countries whose needs cannot be met under IBRD lending programs. Subsequent legislation in Public Laws 88–310, 90–14, 92–247, and 93–373 authorized increased U.S. participation in the resources of IDA, bringing the allowable U.S. contributions to $3,572 million.[4]

3. *The International Finance Corporation* was created to supplement the activities of IBRD by making direct loans to private enterprises without government

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[4] Public Law 92–268, the Par Value Modification Act (as amended by Public Law 93–110), also authorized additional payments "to maintain the value in terms of gold of the U.S. dollar holdings" to the extent provided in the Articles of Agreement of the IBRD, IDA, ADB, and IDB.

guarantees as to repayment. The U.S. subscription of $35,168,000 was authorized by Public Law 84–350.

4. Public Law 89–369 authorized an initial U.S. subscription of $200 million ($100 million paid-in capital and the remainder callable capital) to the *Asian Development Bank;* the purpose of ADB is to foster economic growth and cooperation among countries in Asia and the Far East, collectively and individually. In 1972, $100 million was authorized for a contribution of "United States Special Resources" in Public Law 92–245.[4]

Public Law 93–537 increased the authorized U.S. subscription by $362 million ($72 million paid-in capital and $290 million callable capital) and the contribution to special funds by $50 million. The $150 million special funds resources have been subscribed to the Asian Development Fund.

5. Public Law 86–147 authorized an initial U.S. subscription of $150 million to the paid-in capital, of $200 million to the callable ordinary capital, and of $100 million to the Fund for Special Operations of the *Inter-American Development Bank.* The Bank is authorized to issue securities, and the Government subscription is callable to guarantee such securities. Through 1976, Public Laws 88–259, 89–6, 90–88, 91–599, 92–246, and 94–302 successively raised the authorized subscription to the Fund for Special Operations to $3,400 million. Public Laws 88–259, 90–325, 91–599, and 94–302 have raised the authorizations for callable ordinary capital to over $2,147 million. Public Law 91–599 raised the authorization for paid-in ordinary capital to $300 million.[4] Public Law 94–302 authorized the U.S. subscription of $120 million to the paid-in inter-regional capital stock of the Bank and of $1,080 million to callable inter-regional capital.

6. Public Law 94–302 authorized a U.S. subscription of $25 million to the *African Development Fund.*

Grant, credit, and other transactions covered.—Detailed descriptions of the types of transactions included in these categories are given on pages 39–50 of the *Report* for January–June 1960.[2] The following changes in coverage in the present section should be noted.

1. Revisions in security classifications have enabled the inclusion of data for one credit and two grant programs in this section, although these programs were noted as excluded in the *Report* for January–June 1960.[2] These programs are *Philippine military aid* provided under Public Law 79–454; *Japanese military aid* enacted in section 108 of Public Law 83–665; and credits for *financing of military sales* under subsections 103(c) with maturities up to 10 years and 106(b) with maturities up to 3 years, of Public Law 83–665, as amended, and as superseded by the provisions of subsection 503(a) and of section 522 of Public Law 87–195, as amended, and as superseded by Public Law 90–629. The revised data for these programs are separately shown in *Table B–2* and are incorporated into the other tables, in their proper categories.

Data for military grant deliveries to Southeast Asia, funded by direct Defense Department appropriations—instead of under the Foreign Assistance Act—after enactment of Public Law 89–367, have become available for inclusion in these tables, and are described below in paragraph 4a.

2. The presentation of data on operations of the *Export-Import Bank* has been revised from that used in the *Report* for January-June 1960[2] in respect to participations by others in loans of the Bank, particularly when such participations are guaranteed by the Export-Import Bank.

2a. In the January–June 1960 *Report,*[2] disbursements by U.S. commercial banks and other private entities—with Export-Import Bank guarantee--under the agent-bank program then existing, were included as transactions of the Bank, whereas data on such disbursements (and principal repayments thereon) were *excluded* from the July–December 1961 *Report*[5] and all subsequent *Reports* (see footnote 8 to *Table B–7*). This was done to achieve consistency in the classification of these transactions in the private sector, in all balance-of-payments and foreign banking transactions reporting, and is consistent with the ensuing bank programs, described below.

2b. The Bank also undertook a program for participation of commercial banks in its loans, without guarantee, recording these as "reimbursements by participants." Subsequently, these participations were undertaken "with recourse," effectively with guarantee by the Bank.

In this *Report,* Export-Import Bank loan disbursements are reported after deducting some of the transactions classified by the Bank as "reimbursements by participants." Such reimbursements represent recovery of U.S. Government funds (1) through sales to private U.S. participants of fractions of notes acquired previously for the Export-Import Bank's portfolio or (2) where the Bank acts as an agent for the participating private domestic or foreign entity, or a foreign government, in current disbursements of a loan. However, reimbursements through sales to *foreign* participants, either in the country of the borrower or a third country are not included in "reimbursements by participants," but are included in "principal collections," in this presentation. A participation of other Government agencies (*except* for one transaction involving $7 million and participations in individual loans sold to the Secretary of the Treasury deposit accounts related to foreign government defense procurement in the United States, aggregating $312 million) in loans of the Export-Import Bank is generally not included in disbursements of the Bank in this presentation, but is included against the other program only.

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[4] Public Law 92–268, the Par Value Modification Act (as amended by Public Law 93–110), also authorized additional payments "to maintain the value in terms of gold of the U.S. dollar holdings" to the extent provided in the Articles of Agreement of the IBRD, IDA, ADB, and IDB.

[2] H. Doc. No. 154, 87th Cong., 1st sess.

[5] H. Doc. No. 69; 88th Cong., 1st. sess.

Through fiscal year 1976, these "reimbursement transactions" had been considered sales of assets, and resulted in a reduction of loans receivable. As of June 30, 1976, the Bank changed this accounting treatment with respect to the Certificates of Beneficial Interest (in its loan portfolio) that it had sold, so that these instruments are now treated as borrowings rather than as asset sales. (At the same time, the Bank discontinued new sales of these Certificates.) As a result, loan maturities represented by outstanding guaranteed Certificates of Beneficial Interest ($481 million) were reinstated as loans receivable, and the Certificates are now shown as borrowings payable, in the statements of financial condition of the Bank. The revised accounting statement treatment has *not* been followed in this *Report,* where sales of Certificates of Beneficial Interest continue to be recorded—for long-term series consistency and cross-account consistency with bank-reported statistics on private-sector international financial movements—as described in the preceding paragraph. Consequently, there is *excluded* from indebtedness outstanding to the Export-Import Bank as of December 31, 1976 (as shown in *Table B–8*), $454 million, owed to purchasers of Certificates of Beneficial Interest in foreign assets guaranteed by the Export-Import Bank.

The sale of Eximbank Investment Portfolio Participation Certificates (which afford the purchasers a stipulated return at a fixed rate of interest) is not recorded in these data, even though sold to foreign purchasers.

2c. Many recent Export-Import Bank loans have been extended to cooperative financing facilities, banks which in turn lend to their customers for purchases from the United States. Loans extended by Export-Import Bank to foreign banks are geographically classified in this *Report* against the country of the borrowing foreign bank (including foreign branches of U.S. banks) and are not recorded against the importing country; such loans directly to U.S. parent banks or U.S. branches of foreign banks, in the amount of $10 million outstanding, have been excluded from these data.

3. *Foreign Assistance Act and related programs* are those authorized by the Foreign Assistance Act of 1961 (Public Law 87–195), in particular under parts I and II, as amended. The programs are the successors to the mutual security programs described on pages 40–41, 41–43, and 46–47 of the *Report* for January–June 1960.[2]

Public Law 87–195 repealed the (corporate) Development Loan Fund. Loans of this Fund are included under *Foreign Assistance Act and related programs* in *country program loans.* The Agency for International Development (AID) is the successor to the International Cooperation Administration and the (corporate) Development Loan Fund in operating the programs described on pages 41–50 of the *Report* for January–June 1960.[2]

Loans and grants for Latin American development and Chilean earthquake reconstruction assistance under Public Laws 86–735 and 87–41 are included in *Foreign Assistance Act and related programs.* These include the operations of the Inter-American Foundation (a U.S. Government agency) and of the *Social Progress Trust Fund,* administered by the Inter-American Development Bank on behalf of the United States, the loan transactions of which are separately shown.

Loans of the Overseas Private Investment Corporation (OPIC), created under Title IV of Public Law 87–195, as amended, together with foreign credits extended in disposition of assets acquired by OPIC under its *investment incentive* programs, are also set forth. In the same entries are included assets sold or guaranteed by OPIC that have been purchased by the Federal Financing Bank, described below in paragraph 18.

The U.S. contribution to the capital of the European Payments Union (EPU), to which this Government did not belong, was recorded as a grant in 1950–51 under the European recovery program (one of the predecessor programs to the Foreign Assistance Act). The residual assets of the EPU continued to be available to the European Fund when the European Monetary Agreement entered into force in 1958. Upon liquidation of the European Fund in December 1972, the U.S. Government received that part of the Fund which had originated in the U.S. contribution to the founding of the EPU and the income earned on this capital during the lifetime of the Fund. Of the $232 million recovered by the U.S. Government, $114 million was in the form of assignment to the U.S. Government in 1972 of a credit that had been extended to Turkey by the European Fund; $118 million was paid the U.S. Government in U.S. dollars early in 1973. The 1972 recovery is recorded in the data in this section as a reverse grant under the *Foreign Assistance Act and related programs,* offset by a credit extended to Turkey under *Other credits* described in paragraph 17.

4. *Military aid* under the *Foreign Assistance Act and related programs* includes the transactions under the predecessor mutual security programs described on pages 40–41 of the *Report* for January–June 1960.[2]

4a. *Military assistance, service funded* includes Defense Department estimates of the dollar value of assistance provided under congressional authorization in Public Law 89–367 for "support of Vietnamese and other free world forces in Vietnam . . . on such terms and conditions as the Secretary of Defense may determine." Pursuant to this authorization, funding for such transfers was established under direct Defense Department appropriations instead of from the military assistance programs under the Foreign Assistance Act. *Military assistance, service funded* also includes estimates of the acquisition cost of supplies and equipment which were excess to the needs of the U.S. Armed Forces and transferred to the countries receiving military assistance funded from Defense Department appropriations.

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[2] H. Doc. No. 154, 87th Cong., 1st sess.

Estimates of the value of transfers funded by Defense Department appropriations are based upon the reports compiled by the Defense Department pursuant to Public Law 89–367 (subsection 401(b)), and on supplemental substitute information provided by the Defense Department. Fiscal year estimates of the value of excess supplies and equipment, provided by the Defense Department, have been smoothed into quarterly series and summed into calendar year totals by the Bureau of Economic Analysis.

The Defense Department has indicated that because of combat conditions in Southeast Asia, the reporting system for the support furnished to foreign forces from Defense Department appropriations provided only for recording of data recognizing formal accounting obligation of the appropriation, when available, or the recording of estimates where precise obligation data could not be maintained. The Defense Department in 1974 provided supplemental information requiring appreciable revision of these estimates. It is still endeavoring to provide supporting detail for some of the resulting estimates that have been furnished for use in these statistics. As these data are further analyzed and as additional details become available, further revisions may be made in these presentations. Indications are that these estimated amounts of transfers for the support of foreign forces include services and construction costs as well as supplies and equipment.

4b. Section 3 of Public Law 91–652 authorized the President to transfer to the Republic of Korea defense articles located in Korea and belonging to the Armed Forces of the United States on July 1, 1970. The estimated original acquisition cost of such equipment reported by the Defense Department is included in *Korean military aid*.

4c. *Multilateral construction program contributions* originally authorized under section 104 of Public Law 83–665, as amended, continues under the authority of section 503 (clause (b)) of Public Law 87–195, as amended. Recent appropriations in support of the authorization were made directly to the Defense Department.

4d. *Grants financing military purchases* include expenditures (1) to release Israel from its contractual liability to pay for defense articles purchased through military sales contracts or to repay credits extended for such purposes through military sales contracts or from commercial suppliers and (2) to finance equipment purchased for the Egyptian surveillance station under subsection 903(c) of the Foreign Assistance Act of 1961, as amended by Public Law 94–329.

Transactions under the Emergency Security Assistance Act of 1973 (Public Law 93–199) are included in these data: There were extraordinary deliveries of material to Israel, associated with the Middle East war that began October 1973. This equipment was ordered by Israel from the U.S. military services under the Arms Export Control Act (Public Law 90–629), utilizing the provisions for short-term credit for payment within 120 days of delivery. Under Public Law 93–199, the President determined in 1974 that $1½ billion of the funds authorized would be used to release Israel from its contractual liabilities to pay for the defense articles and services purchased under the Arms Export Control Act. These transactions are recorded as *Grants financing military purchases* when expenditures are made against the appropriation (Public Law 93–240). Additional similar releases from contractual liability authorized under subsequent legislation (Public Law 93–559 (subsection 45(a)(7)(B)) and Public Law 94–329 (subsection 210(c)(1))) are also included. Repayable long-term credits extended under Public Law 93–199 and the subsequent legislation are *not* included in this entry.

4e. *Credits financing military purchases* under Public Law 87–195 and under the earlier mutual security programs described on page 47 of the *Report* for January–June 1960[2] are included along with those under Public Law 90–629. This entry also includes long-term credits extended to Israel under section 501 of Public Law 91–441 and under section 3 of the Emergency Security Assistance Act (Public Law 93–199). Included in this entry are credits disbursed by the Federal Financing Bank (described below in paragraph 18), when such assets have been guaranteed by the Defense Department under provisions of Public Law 90–629, the Arms Export Control Act.

5. Public Law 89–808 amended Title II of Public Law 83–480 consolidating into this one title the authorizations to extend grants by transfers of agricultural commodities *for famine, other urgent, and extraordinary relief, for economic development, and through private welfare agencies*. This authority continues the programs described on page 43 of the *Report* for January–June 1960.[2]

All transfers under these authorizations for calendar year 1966 and later are included in these data at values approximating a current export value rather than the price paid by the Agriculture Department in support of domestic commodity prices. Donations through private welfare agencies from July 1, 1954, through December 31, 1965, are also included at values approximating a current value. Donations through private agencies transferred before fiscal year 1955, and transfers under famine and other urgent and extraordinary relief before calendar year 1966, are included in these data at Commodity Credit Corporation cost value.

6. Under the *Agricultural Trade Development and Assistance Act* (Public Law 83–480, as amended), foreign currencies obtained from the sale of agricultural commodities through 1971 were available for *currency loans to foreign governments* and *currency loans to private enterprises* without an additional congressional appropriation. Most *currency loans to foreign governments* are those under the subsection which authorizes loans to promote multilateral trade and economic development, through established banking facilities of the

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[2] H. Doc. No. 154, 87th Cong., 1st sess.

nation where the foreign currency was obtained, or in any other manner which the President may deem to be appropriate. Some loans are under the subsection which authorizes use of the foreign currencies to procure equipment, materials, facilities, and services for the common defense including internal security. Under the subsection which authorizes use of the foreign currencies for financing the purchase of goods and services for other friendly nations, the currencies have been used to provide loans to third countries. In practice, most of the loans have been made to foreign governments or government-controlled banking institutions, but some have been made, under the authority given to the President, to private entities. These loans are administered by AID and utilization represents the dollar equivalent of foreign currencies disbursed, as reported by AID. Collections of principal and interest are in dollars and foreign currencies.

7. *Long-term dollar credits under the Agricultural Trade Development and Assistance Act* (providing long-term supply contracts repayable in dollars), includes those originally authorized by section 14 of Public Law 86–341 and by other, subsequent amendments to Public Law 83–480, in particular section 106, as amended by Public Law 89–808. Also included as dollar credits are those under subsection 103(b) under agreements which permit the U.S. Government at its option to elect, in lieu of dollar repayment, collections in readily convertible currencies of third countries; through 1976, no such option has been elected and collections have been in U.S. dollars.

Subsection 103(b) also provided for agreements which permit the U.S. Government to obtain accelerated *currency-use payments* (CUP) in the borrower's currency upon delivery of the agricultural commodity. These payments are considered to be advance payments of the contractual installments of principal and interest. Accordingly, the exercise of a U.S. Government option to collect a currency-use payment results in the decrease of the principal amount outstanding on the credit, until the currency-use payment is applied as meeting an interest installment otherwise due according to the credit repayment schedule. At such time, interest is recorded as an imputed collection, and an equivalent addition to principal outstanding (i.e., a disbursement) is recorded.

In addition to intergovernmental credits, those credits under section 107, to private trade entities, are also included in this entry.

8. *International refugee assistance* includes assistance provided through international organizations, and through grants to voluntary agencies for work abroad, under the Migration and Refugee Assistance Act of 1962 (Public Law 87–510), as amended, and under the Indochina Migration and Refugee Assistance Act of 1975 (Public Law 94–23), as amended. Support of the International Committee of the Red Cross, a Swiss voluntary agency, authorized under Public Law 89–230, as amended, and assistance to Israel in the resettlement of refugees from the U.S.S.R., first authorized under Public Law 92–352, are also included.

9. Additional compensation for the unpaid balances of awards for war damage claims under Title I by the Philippine Rehabilitation Act of 1946 (Public Law 79–370) was authorized in Public Law 87–616 and is included in entries for *Philippine rehabilitation program.*

10. *Peace Corps program* includes the services rendered under Public Law 87–293, as amended, by Americans helping foreign countries meet their needs for trained manpower. This assistance is measured in terms of the expenditure of funds appropriated for expenses, allowances, services, and equipment of the Peace Corps volunteers and includes training and administrative costs of the program.

11. An agreement with Japan for settlement of postwar economic assistance was signed January 9, 1962, and entered into force September 11, 1962. An agreement with Japan concerning reversion of the Ryukyu Islands was signed June 17, 1971, and entered into force May 15, 1972.

On October 18, 1972, an agreement regarding settlement of lend-lease, reciprocal aid, and claims was signed with the Soviet Union.

As these agreements reflect conversions—into repayable principal credits—of amounts previously reported as grants, no utilization of credits is reported in the accompanying tables, but principal and interest collections, where applicable, are included in the respective data for *lend-lease, surplus property,* and *settlements for grants and war accounts,* in the manner similar to other settlements described on page 48 of the *Report* for January–June 1960.[2]

12. Returns under the *civilian supply program* include proceeds from the sale of stock of the Bank of the Ryukyus in 1972. This investment in the Bank was an asset of the general fund of the U.S. Civil Administration of the Ryukyu Islands, which had been funded from the civilian supply (government and relief in occupied areas) program.

13. *Other reverse grants and returns* includes the contribution from Japan which—under the agreement of April 18, 1969, and Public Law 92–39—was combined with an equivalent amount of U.S. Government funds and disbursed for the welfare of the people of the Trust Territory of the Pacific Islands.

14. *Surplus property credits* includes, beginning in 1973, credits arising from sale of Government-owned land and structures, now excess for Foreign Service needs, on the basis of deferred collections.

15. *Other credits* includes credits by the Atomic Energy Commission under the *Atomic Energy Act,* Public Law 83–703, as amended, wherein the Atomic Energy Commission is authorized to sell material to any country with which an agreement for cooperation has been signed, and under the EURATOM Cooperation Act of 1958 (Public Law 84–846, as amended), which authorized the sale on (first lien) credit terms of material to the European Atomic Energy Community.

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[2] H. Doc. No. 154, 87th Cong., 1st sess.

16. *Other credits* includes the credits extended under the authority of the *Commodity Credit Corporation Charter Act* through the Corporation's export credit sales program GSM-4, whereby beginning April 27, 1967, it purchased foreign receivables from U.S. exporters. Data on receivables with original maturities in excess of 12 months from date of delivery are incorporated into the tables in this *Report;* data on the receivables purchased by CCC under program GSM-4 but originally representing financing periods of 12 months or less, amounting to $76 million outstanding as of December 31, 1976, are *not* included in these data. Transactions under the earlier CCC export credit sales programs were excluded from the table in this section since they did not represent obligations of a foreign debtor to the U.S. Government. Under settlement arrangements with the Arab Republic of Egypt consolidating past due debts, a claim arising under CCC export credit sales program GSM-3 for about $85 million was recognized by that Government and is included in the data in this *Report*.

17. *Other credits (miscellaneous)* includes the credits under Public Law 86-383, Title II, which appropriated funds for loans by the Secretary of the Army to the Ryukyu Electric Power Corporation for construction, installation, and equipment of electric power systems; loans extended by the U.S. Information Agency for binational centers, under provisions of Public Laws 80-402 and 87-256; and credits established in postal debt settlements for claims for reimbursement for services rendered by the U.S. Postal Service.

Other credits (miscellaneous) also includes the extension of credit through acceptance of the asset (in the form of a $114 million credit repayable by Turkey) assigned to the U.S. Government as part of its recovery of the residual capital of the European Payments Union, as described in paragraph 3, above.

18. Public Law 92-224 created the Federal Financing Bank (FFB), an instrumentality of the U.S. Government. FFB purchases and sells obligations which are issued, sold, or guaranteed by Federal agencies. In this section of this *Report*, such transactions are classified with those of the program providing the guarantees: FFB has committed and disbursed upon loans extended under guaranty from the Overseas Private Investment Corporation and from the Defense Department under Public Law 90-629, as described in paragraphs 3 and 4e, above.

Definitions

Although there exists a wide variety of transactions and differences in the statistical and accounting procedures of the various Government agencies, and it is not possible to prepare simple definitions applicable to all cases, it is believed that the following classifications used in this section are generally consistent.

1. *Utilized* assistance is measured generally in terms of goods delivered or shipped, services rendered, or cash disbursed by the U.S. Government to or for the account of a foreign government or other foreign entity. Utilized assistance thus represents the goods transferred, the services rendered, or the cash disbursed depending upon the mechanics of furnishing the aid. However, many services are rendered which are not included in foreign assistance.

Reverse grants and returns on grants and collections on credits are measured in similar fashion.

Utilized grants represent the tangible foreign assistance that has moved either as an outright or conditional gift, or subject to future settlement. Utilized credits represent the tangible foreign assistance that has moved subject to repayment of the principal amount and, usually, of interest.

Utilizations under several aid programs shown in *Table B-2* include credits extended to refinance principal collections and to capitalize interest. Many agreements for the reorganization of the debt of developing countries are recorded as utilizations of the new (reorganization) credits offset by principal collections and interest received.

For a more itemized explanation of "utilized," by the aid programs shown in *Table B-2*, refer to the sections on *Transactions covered* (pp. 39-50) in the explanatory note in the *Report* for January-June 1960,[2] as amended by the notes in the preceding sections of this Explanatory Note.

2. *Returned* represents returns of grants (such as lend-lease merchant ships), cash settlements for grants, and reverse grants (such as lend-lease and counterpart funds furnished the U.S. Government under the Foreign Assistance Act program and earlier economic cooperation programs).

3. *Repaid* represents payments received and applied to the reduction of outstanding principal indebtedness, excluding principal repayments on debts arising out of World War I. Repayments on guaranteed loans, where Government money was not disbursed, are excluded. Amounts charged off, or changes in outstanding indebtedness due to exchange rate variations, are excluded (see *Table B-10*).

Repayments include amounts applied to principal by utilization of refinancing credits.

Sales of promissory notes (or other evidences of indebtedness) to foreigners, either in the country of the borrower or a third country, are included in principal collections. Such "principal collection" is recorded against the country of the borrower in this *Report*.

4. *Interest and commissions* represents payments received on *credit transactions* (which see) and applied to income, and includes, in addition to interest on outstanding indebtedness, any regular collections for service charges, commitment fees on undisbursed balances, and the commissions which a Government agency, such as the Export-Import Bank, collects when a private institution participates in a loan of the agency. Interest payments on debts arising out of World War I are *not* included nor is interest received on deposits in foreign banks (including funds acquired under agricultural sales programs).

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[2] H. Doc. No. 154, 87th Cong., 1st sess.

TABLE B-1.—*Summary of major U.S. Government foreign assistance, military and other, by area and country, postwar period, July 1, 1945, to Dec. 31, 1976* [1]

[In millions of dollars and equivalents]

Area and country	Total (net)[2]	Military supplies and services (net grants)[3]	Other aid (economic and technical assistance)											
			Total (net)	Net grants[4]			Net credits[4]			Other assistance (through net accumulation of foreign currency claims)				
											Currency claims acquired—		Less currencies used—	
				Total	Gross grants	Less reverse grants and returns	Total	New credits	Less principal collections	Total	Through sale of farm products	From 2d-stage operations[5]	For grants and credits in recipient's currency	For other purposes
Total, all areas	179,246	65,686	8,448	70,557	72,484	1,926	35,891	70,711	34,820	2,000	14,996	4,332	13,324	4,003
Total, investment in international financial institutions	5,112													
Total, Europe	[3] 54,843	[3] 23,774	31,069	22,993	24,656	1,663	7,472	20,722	13,250	603	3,699	397	1,872	1,621
Total, Western Europe	[3] 52,853	[3] 23,774	29,079	21,872	23,495	1,623	6,890	18,990	12,101	318	3,179	397	1,872	1,387
Austria	1,195	106	1,089	1,045	1,099	54	45	167	122	(*)	56		26	30
Belgium and Luxembourg	1,925	1,255	670	581	583	2	89	351	262	(*)	2			2
Cyprus	60		60	56	56		4	8	4	(*)	2	(*)	1	1
Denmark	932	633	299	234	248	14	65	114	49		4		2	2
Finland	51	(*)	51	4	4		40	208	168	8	48	10	23	27
France	8,505	4,398	4,107	4,183	4,367	184	−78	2,380	2,458	2	251	6	46	208
Germany	3,778	856	2,922	3,831	3,908	77	−908	524	1,432	−2	163		96	69
Greece	4,457	2,461	1,996	1,472	1,547	75	524	874	350	(*)	202	52	158	97
Iceland	56		56	34	36	2	22	61	38	(*)	16	5	12	9
Ireland	72		72	17	18	1	54	180	125	(*)				(*)
Italy	5,493	2,511	2,982	2,773	2,854	81	209	1,304	1,094	(*)	237	5	120	121
Malta	64		64	59	59		5	6	1					
Netherlands	2,231	1,274	957	844	896	51	112	600	488	(*)	9		7	2
Norway	1,467	934	533	217	239	22	316	486	171	(*)	2		1	2
Portugal	639	352	287	86	88	1	201	340	139	(*)	7	1	3	5
San Marino	1		1	1	1									
Spain	2,091	776	1,315	393	588	194	837	1,533	695	84	710	66	380	312
Sweden	115		115	87	87		28	67	39	(*)				(*)
Switzerland	86		86				86	93	7	(*)				(*)

Turkey	7,079	4,193	2,886	1,151	1,238	87	1,674	2,031	357	61	526	156	332	289
United Kingdom	6,947	1,124	5,823	3,277	3,798	521	2,546	5,718	3,172	(*)	216		96	120
Yugoslavia	2,785	719	2,065	1,047	1,072	25	854	1,563	709	164	729	96	569	92
European Atomic Energy Community	39		39				39	108	69					
European Coal and Steel Community	19		19				19	100	81					
European Payments Union	6		6	6	238	232								
Other and unspecified Western Europe	2,759	2,180	580	474	474		106	176	70					
Total, other Europe	1,990		1,990	1,121	1,161	39	583	1,732	1,149	286	520			234
Albania	20		20	20	20									
Czechoslovakia	191		191	186	186	(*)	5	13	8					
East Germany	17		17	17	17									
Hungary	17		17	17	17		(*)	18	18					
Poland	1,047		1,047	444	444	(*)	318	631	313	286	520			234
Romania	114		114	10	10		104	204	100					
U.S.S.R.	583		583	426	466	39	156	865	709					
Total, Africa	8,073	421	7,652	3,905	3,998	93	3,364	4,657	1,293	383	1,178	307	812	290
Algeria	465		465	182	182		284	315	31	(*)	(*)			(*)
Angola	5		5				5	11	6					
Benin	26	(*)	26	16	16		9	10	(*)	(*)			(*)	(*)
Botswana	43		43	24	24		20	20						
Burundi	10		10	10	10									
Cameroon	71	(*)	71	33	33		38	41	3					
Cape Verde	5		5	5	5									
Central African Empire	12		12	9	9		3	3						
Chad	31		31	31	31									
Congo	11		11	11	11			(*)	(*)					
Egypt	1,564	13	1,551	391	391	(*)	839	1,187	348	322	809	218	532	174
Ethiopia	559	232	328	199	199		129	178	49	(*)	3	(*)	4	(*)
Gabon	23		23	8	8		15	15						
Gambia	10		10	10	10									
Ghana	283	1	283	86	86		194	278	84	3	37	10	24	19
Guinea	135	1	135	51	51		78	87	9	5	32	4	24	7
Guinea-Bissau	1		1	1	1									
Ivory Coast	72	(*)	72	24	24		48	60	12	(*)	3	(*)	2	2
Kenya	135	1	134	87	87		47	59	13	(*)	(*)			(*)
Lesotho	33		33	33	33									
Liberia	265	9	256	147	147		108	227	119	(*)				(*)
Libya	224	18	206	206	206		(*)	7	7	(*)			1	*-1
Madagascar	21	(*)	21	15	15		6	6			(*)			(*)
Malawi	41		41	21	21		20	20						

See footnotes at end of table.

TABLE B-1.—*Summary of major U.S. Government foreign assistance, military and other, by area and country, postwar period, July 1, 1945, to Dec. 31, 1976*[1]—Continued

[In millions of dollars and equivalents]

Area and country	Total (net)[2]	Military supplies and services (net grants)[3]	Other aid (economic and technical assistance)											
			Total (net)	Net grants[4]			Net credits[4]			Other assistance (through net accumulation of foreign currency claims)				
				Total	Gross grants	Less reverse grants and returns	Total	New credits	Less principal collections	Total	Currency claims acquired— Through sale of farm products	Currency claims acquired— From 2d-stage operations[5]	Less currencies used— For grants and credits in recipient's currency	Less currencies used— For other purposes
Mali	75	3	72	68	69	(*)	3	3	(*)	(*)	1	(*)	(*)	(*)
Mauritania	30		30	26	26		4	4	(*)					
Mauritius	14		14	14	14									
Morocco	991	53	938	399	399		533	732	198	5	88	27	81	29
Mozambique	13		13	11	11		1	2	(*)					
Niger	78	(*)	78	75	75		3	3	(*)					
Nigeria	374	2	373	271	271	(*)	101	115	13	(*)			(*)	(*)
Rwanda	17		17	17	17	(*)					(*)			(*)
Senegal	75	3	72	66	66		5	6	1	(*)	3	(*)	1	2
Seychelles	1		1	1	1									
Sierra Leone	62		62	50	50		12	15	4	(*)		(*)	(*)	(*)
Somalia	92		92	76	76		16	17	1	(*)		(*)	1	[6]–1
South Africa	–92		–92	–92	(*)	93	(*)	154	154	(*)	(*)			(*)
Sudan	134	1	134	86	86		44	70	27	4	26	2	12	13
Swaziland	9		9	7	7		3	3						
Tanzania	197		197	127	127		70	73	4	(*)	(*)	(*)		1
Togo	30		30	28	28	(*)	2	2	(*)					
Tunisia	800	50	751	420	420		312	394	83	20	90	37	91	16
Uganda	45		45	34	34		11	11	(*)					
Upper Volta	54	(*)	54	54	54						(*)			(*)
Zaire	638	33	605	258	258		324	355	31	23	85	7	39	29
Zambia	43		43	6	6		37	58	21				(*)	(*)
East African Common Services Organization	2		2				2	3	1					
Other and unspecified Africa	346	3	343	304	304		39	112	73					
Total, Western Hemisphere	13,567	1,339	12,227	4,151	4,154	3	7,814	14,424	6,610	262	898	102	496	242

Antigua	1		1	1	1		1	2	1						
Argentina	482	86	396	21	21		368	1,115	747	6	31	1	15	10
Bahamas	28		28	(*)	(*)		28	55	27					
Barbados	3		3	2	2		1	1	(*)					
Belize	7		7	7	7		(*)	(*)	(*)					
Bermuda	10		10				10	28	18					
Bolivia	668	46	622	341	341	1	280	340	59	1	68	14	57	23
Brazil	3,576	303	3,273	607	607		2,472	4,243	1,771	194	510	22	247	91
Cayman Islands	11		11				11	14	3					
Chile	1,495	139	1,356	254	254	(*)	1,078	2,070	992	23	85	18	49	31
Colombia	1,358	125	1,233	301	301	(*)	916	1,372	456	16	66	22	40	33
Costa Rica	209	2	207	118	118		89	145	55		(*)			(*)
Cuba	57	16	41	5	5	(*)	36	40	3					
Dominica	1		1	1	1									
Dominican Republic	575	34	542	263	264	(*)	278	362	83	(*)	(*)	1		1
Ecuador	325	62	263	142	142	(*)	120	229	109	1	12	3	8	6
El Salvador	165	12	153	81	81		72	101	29	(*)	(*)			(*)
Grenada	1		1	1	1									
Guadeloupe														
Guatemala	373	30	343	235	235		108	155	47	(*)	9		9	(*)
Guyana	86		86	27	27		59	60	1	(*)	(*)	(*)		(*)
Haiti	162	5	157	127	127	(*)	30	47	17			(*)		(*)
Honduras	192	14	178	96	96		82	105	23	(*)	(*)	(*)		(*)
Jamaica	146	1	145	50	50		96	135	39		(*)			(*)
Mexico	743	2	741	160	160	(*)	581	1,550	970	(*)	25	6	18	13
Netherlands Antilles	3		3				3	3	(*)					
Nicaragua	244	23	221	94	94		127	169	41		(*)			(*)
Panama	360	9	351	156	156		195	268	73	(*)				(*)
Paraguay	162	24	138	81	81	(*)	57	92	35	(*)	16	4	12	8
Peru	678	140	538	238	238	(*)	297	779	482	2	40	9	26	21
Surinam	9		9	5	5		4	7	3					
Trinidad and Tobago	51		51	35	35		17	40	23					
Uruguay	220	67	153	32	32	(*)	104	144	40	18	36	3	16	6
Venezuela	256	18	238	67	67	(*)	171	565	394	(*)				(*)
Central American Bank for Economic Integration	141		141	(*)	(*)		141	148	6					
Central American Monetary Stabilization Fund	10		10				10	10						
Caribbean Development Bank	14		14				14	14						
Andean Development Corporation	4		4				4	4						
Other and unspecified Western Hemisphere	741	183	558	605	607	2	−47	15	62					
Total, Asia	[3] 88,250	[3] 39,691	48,559	31,261	31,404	143	16,546	28,917	12,372	752	9,221	3,526	10,145	1,850
Afghanistan	463	5	458	354	354		101	149	48	4	6	3	1	4

See footnotes at end of table.

TABLE B-1.—*Summary of major U.S. Government foreign assistance, military and other, by area and country, postwar period, July 1, 1945, to Dec. 31, 1976* [1]—Continued

[In millions of dollars and equivalents]

Area and country	Total (net)[2]	Military supplies and services (net grants)[3]	Other aid (economic and technical assistance)											
			Total (net)	Net grants[4]			Net credits[4]			Other assistance (through net accumulation of foreign currency claims)				
											Currency claims acquired—		Less currencies used—	
				Total	Gross grants	Less reverse grants and returns	Total	New credits	Less principal collections	Total	Through sale of farm products	From 2d-stage operations[5]	For grants and credits in recipient's currency	For other purposes
Bangladesh	779		779	319	319		459	549	90	(*)	(*)	2		2
Brunei	(*)		(*)				(*)	20	20					
Burma	201	89	112	60	60	1	45	61	16	8	48	12	39	13
Cambodia[7]	2,176	1,328	848	638	640	2	207	286	79	3	18	79	88	7
China (Taiwan)	7,300	4,521	2,779	1,901	1,909	8	876	1,386	510	2	493	33	410	114
Hong Kong	85		85	43	43		41	44	3	1	1			1
India	9,221	114	9,107	4,693	4,722	29	3,981	7,355	3,373	432	4,146	2,457	5,520	650
Indonesia	2,487	182	2,305	424	430	6	1,658	2,090	431	222	292	23	60	33
Iran	2,181	896	1,285	461	475	14	825	1,865	1,039	−1	64	21	42	43
Iraq	87	50	37	31	31	(*)	6	27	20					
Israel	6,905	2,450	4,455	1,578	1,579	(*)	2,841	3,854	1,013	36	412	180	406	150
Japan and Ryukyu Islands	4,200	1,668	2,533	2,634	2,643	9	−101	2,984	3,085	(*)	193		116	78
Jordan	1,299	273	1,026	918	918	(*)	108	162	54	(*)	6	3	4	6
Korea	12,131	5,896	6,235	4,482	4,509	27	1,735	2,275	540	18	1,030	117	866	262
Kuwait								50	50					
Laos[7]	2,551	1,644	908	908	908	(*)	(*)	(*)		(*)	(*)		(*)	
Lebanon	191	15	176	109	109		67	99	32	(*)		1		1
Macao	5		5	5	5									
Malaysia	132	2	130	58	58		71	151	79	(*)	(*)			(*)
Nepal	210	2	208	191	191		3	4	1	14	(*)	2	7	[6]−19
Pakistan	5,582	692	4,891	2,020	2,055	34	2,734	3,234	500	136	1,321	171	1,217	139
Philippines	2,470	734	1,736	1,286	1,293	7	441	947	506	10	142	23	110	46
Saudi Arabia	59	38	21	31	31		−10	266	276					
Singapore	93		93	3	3		90	93	3		(*)			(*)
Sri Lanka	264	3	260	110	110		148	184	36	3	34	7	21	18
Syria	96	(*)	96	37	37		50	57	7	9	35	4	12	18
Thailand	1,994	1,344	651	566	570	4	84	168	84	(*)	5	2	2	5

Vietnam[7]	23,538	16,848	6,690	6,736	6,736		97	556	459	−143	973	387	1,225	278
Yemen (Aden)	3		3	3	3									
Yemen (Sana)	71	(*)	71	71	71									
Asian Development Bank	1		1	1	1									
Other and unspecified Asia	1,473	897	576	590	593	2	−14	2	16					
Total, Oceania	[3]1,082	[3]3	1,079	710	730	20	368	1,314	945	(*)				(*)
Australia	231		231	−7	13	20	239	1,066	828	(*)				(*)
Fiji	6		6	6	6									
New Caledonia	1		1				1	2	(*)					
New Zealand	115	3	112	2	2		110	214	105					
Papua New Guinea	18		18	(*)	(*)		18	30	12					
Solomon Islands	2		2	2	2									
Tonga	5		5	5	5									
Trust Territory of the Pacific Islands	696		696	696	696		(*)	1	1					
Western Samoa	6		6	6	6									
Other and unspecified Oceania	(*)		(*)	(*)	(*)									
Canada	287	9	278				278	535	257	(*)				(*)
Other international organizations and unspecified, all areas	8,033	449	7,584	7,537	7,541	4	48	141	94					

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* Less than $500,000 (plus or minus).

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note.

[2] Includes "Investment in international financial institutions" not shown in a separate column.

[3] Military supplies and services grant data were reported by the Defense Department between 1949 and 1976 under varying security restrictions. Despite subsequent withdrawal of many of these restrictions, data for activities under Public Laws 83–665 and 87–195 are generally not available in sufficient detail to show military supplies and services by country and by calendar year. They are thus shown only in area totals elsewhere in this *Report*. However, "Foreign Military Sales and Military Assistance Facts," indicating accomplishment of selected grant assistance to most countries, by fiscal years, has been published by the Defense Department (December 1976). Although amounts included in that Defense Department release (incorporating unpublished amendments and revisions) are not exactly equivalent to the amounts reported by the Defense Department between 1949 and 1976 for inclusion by area in this report, such available country data have been incorporated into this table. Offsetting adjustments have been made in the "Unspecified" categories to retain the area totals originally recorded. The "Unspecified" categories also include values of some military aid where data remain classified because of intergovernmental agreement or because of their sensitive nature.

Data on a calendar year basis in tables B–3 and B–4 for military assistance to Afghanistan, India, Iran, Iraq, Jordan, Lebanon, Nepal, Pakistan, Saudi Arabia, Sri Lanka (Ceylon), Syria, and Yemen (Sana) are not available; consequently, the amounts for these countries, along with those for Greece and Turkey, are included in the data for Western Europe in those tables. Similarly, military grant aid to New Zealand is included in the data for Asia in tables B–3 and B–4.

Credits which finance the sale of military supplies and services are not included here; they are included as part of credits.

[4] New credits do not include $3,682,954,000 representing settlements for postwar relief and other grants under agreements, including that for the reversion of the Ryukyu Islands to Japan. New grants have not been adjusted for any part of these settlements. For [illegible] these amounted to: Germany $1,000,000,000; Soviet Union, [illegible]; Japan, $810,000,000; United Kingdom, $562,447,000; France, $353,500,000; and Netherlands, $47,160,000. Although settlements have not been reached with China, for statistical convenience the amount of postwar lend-lease credits ($50,345,000) is included in the total of "settlements" noted here, and thus reported in grants rather than credits.

[5] Includes foreign currencies acquired from triangular trade operations and principal and interest collections on credits, originally extended under Public Law 83–480, which—since enactment of Public Law 87–128—are available for the same purposes as Public Law 83–480 currencies.

[6] Currency of one country used for intercountry transfers is included in uses for that country, but the equivalent amount is deducted from uses for the second country, to which the United States transfers its claim. This results in a negative entry in this column in those instances where the value of the U.S. claim transferred to the second country exceeds the value of currency used in it. If a specific negative value is not shown for a country, then the excess of value of the U.S. claim transferred to this country over the value of currency used in it is less than $500,000.

[7] Separate detail data for Cambodia, Laos, and Vietnam became available during 1954. For earlier periods data for Indochina are included in "Unspecified Asia."

Source: Compiled by Bureau of Economic Analysis, U. S. Department of Commerce, from information made available by operating agencies.

TABLE B-2.—*Summary of major U.S. Government net foreign assistance, July 1, 1945, to Dec. 31, 1976, gross and returned, by type and by program*[1]

[In millions of dollars and equivalents]

Type and program	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
Net total, all programs	179,246	7,940	8,681	7,322	6,804	8,242	7,468	132,789
INVESTMENT IN INTERNATIONAL FINANCIAL INSTITUTIONS								
Total	5,112	1,102	654	537	373	271	246	1,928
African Development Fund	15	15						
Asian Development Bank	185	75	30	2	12	17		50
Inter-American Development Bank	1,876	255	268	192	197	180	175	610
International Bank for Reconstruction and Development	648				12	1		635
International Development Association	2,353	757	357	344	152	73	71	599
International Finance Corporation	35							35
GRANTS								
Net	136,243	3,620	5,148	7,380	4,790	6,700	5,622	102,984
Gross (new)[2]	138,692	3,622	5,154	7,389	4,920	6,820	5,625	105,162
Military aid	66,209	1,356	2,905	2,849	2,862	4,529	3,582	48,127
Under Foreign Assistance Act and related programs:								
Military supplies and services[3]	40,856	388	824	975	838	770	789	36,273
Multilateral-construction program contributions	1,550	88	38	88	43	35	34	1,225
Military assistance, service funded	18,169		1,396	849	1,981	3,629	2,583	7,730
Financing of military purchases	2,463	879	647	937				
Vessel loans	586	(4)	(4)	(4)	(4)	(4)	(4)	[4] 586
Japanese military aid	540							540
Chinese military aid	120							120
Korean military aid	271					95	176	
Lend-lease	679							679
Greek-Turkish aid	530							530
Chinese naval aid	141							141
Philippine military aid	132							132
Military equipment "loans" (other than under Foreign Assistance Act)	171	(4)	(4)	(4)	(4)	(4)	(4)	[4] 171
Other	72,484	2,266	2,249	4,540	2,059	2,290	2,043	57,036
Under Foreign Assistance Act and related programs	43,707	1,617	1,554	1,562	1,335	1,388	1,230	35,021
Under authorizations for farm products disposals:								
From foreign currencies under the Agricultural Trade Development and Assistance Act	6,321	39	20	2,316	197	273	251	3,226
For famine, other urgent, and extraordinary relief, for economic development, and through private welfare agencies[5]	6,399	304	309	316	247	351	304	4,570
Payment of transportation	1,535	94	120	121	81	132	97	890
Civilian supplies and lend-lease	7,193					1	6	7,186
UNRRA, post-UNRRA, and interim aid	3,443							3,443

See footnotes at end of table.

TABLE B-2.—*Summary of major U.S. Government net foreign assistance, July 1, 1945, to Dec. 31, 1976, gross and returned, by type and by program* [1]—Continued

[In millions of dollars and equivalents]

Type and program	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
Philippine rehabilitation	676							676
Inter-American aid and technical assistance	145							145
Inter-American and related highways	192	14	9	8	5	3	2	151
International refugee assistance	571	38	87	59	52	14	19	302
International children's assistance	81							81
Greek-Turkish aid	122							122
Chinese stabilization	120							120
Yugoslav aid	38							38
Trust territory development	661	87	77	71	62	55	51	258
Peace Corps	1,218	74	72	88	80	72	84	748
Libyan special purpose funds	36							36
Berlin investment fund	13							13
American Red Cross	10							10
Other	(*)			(*)	(*)	(*)	(*)	(*)
Less reverse grants and returns	2,449	3	6	9	130	120	3	2,178
Military aid	523	3	4	7	10	2	2	495
Under Foreign Assistance Act and related programs:								
Foreign currency collections [6]	188	3	4	7	10	2	2	161
Return of vessel "loans"	5	(4)	(4)	(4)	(4)	(4)	(4)	[4] 5
Settlement for reversionary rights on military assistance	75							75
Return of lend-lease ships	189							189
Return of military equipment (other than under Foreign Assistance Act)	65	(4)	(4)	(4)	(4)	(4)	(4)	[4] 65
Other	1,926	(*)	2	2	120	118	1	1,683
Under Foreign Assistance Act and related programs:								
Dollar cash return	125				118			6
Other	1,235	(*)	(*)	(*)	(*)	114	1	1,119
Civilian supplies, lend-lease, and cash settlements for grants	561					3		558
Other	7		2	2	2			(*)
CREDITS								
Net	35,891	3,272	2,849	—348	1,690	1,484	1,845	25,097
Gross (new) [2]	70,711	5,823	5,293	4,468	4,252	3,534	3,935	43,405
Under Export-Import Bank Act	27,023	1,990	2,490	2,578	1,680	1,298	1,426	15,563
Under Foreign Assistance Act and related programs:								
Country program loans	16,762	913	620	583	614	554	886	12,594
Social Progress Trust Fund	747	34	21	24	34	26	23	584
Deficiency and basic materials development	147							147
Financing of military purchases	4,793	1,448	823	550	478	372	486	635
Investment incentive credits	129	13	69	29	7	6	3	2

See footnotes at end of table.

TABLE B-2 *–Summary of major U.S. Government net foreign assistance, July 1, 1945, to Dec. 31, 1976, gross and returned, by type and by program*[1]—Continued

[In millions of dollars and equivalents]

Type and program	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
Under Agricultural Trade Development and Assistance Act:								
Currency loans to foreign governments	5,181	5	2	9	8	22	93	5,041
Currency loans to private enterprises	423	4	1	4	7	31	39	336
Long-term dollar credits	6,186	737	949	547	572	647	583	2,150
Lend-lease and surplus property	1,658				42		47	1,568
Other credits	7,662	678	318	145	809	578	349	4,786
British loan	3,750							3,750
Occupied-areas commodity credits	283							283
Reconstruction Finance Corporation loans	70							70
United Nations loans	141							141
Philippine funding	37							37
Under Atomic Energy Act	84		(*)	–2	10	5	9	62
Under Commodity Credit Corporation Charter Act	3,111	678	318	147	799	459	339	371
Miscellaneous	186	(*)	(*)	(*)	–1	114	2	71
Less principal collections	34,820	2,550	2,444	4,816	2,562	2,051	2,090	18,307
Under Export-Import Bank Act	16,561	1,018	992	1,111	1,089	1,048	1,220	10,082
Under Foreign Assistance Act and related programs:								
Country program loans	3,903	477	304	529	229	194	275	1,895
Social Progress Trust Fund	239	32	31	29	26	24	20	77
Deficiency and basic materials development	133	1	1	1	3	1	1	128
Financing of military purchases	1,331	255	180	185	145	75	80	410
Investment incentive credits	26	10	10	5	1	(*)	(*)	(*)
Under Agricultural Trade Development and Assistance Act:								
Currency loans to foreign governments	2,547	82	108	1,874	117	79	45	242
Currency loans to private enterprises	234	16	16	18	18	19	21	125
Long-term dollar credits	1,374	124	111	373	280	142	104	240
Lend-lease, surplus property, and settlements for grants and war accounts	4,216	99	130	103	248	193	126	3,317
Other credits	4,257	437	562	589	405	277	197	1,791
British loan	1,192		71	70	69	67	66	849
Occupied-areas commodity credits	283							283
Reconstruction Finance Corporation loans	365							365
United Nations loans	94	5	6	5	5	5	5	62
Philippine funding	37							37
Under Atomic Energy Act	34	6	5	3	9	1	4	6
Under Commodity Credit Corporation Charter Act	2,188	425	478	510	321	203	120	130
Miscellaneous	65	1	1	1	1	1	1	58

See footnotes at end of table.

TABLE B-2.—*Summary of major U.S. Government net foreign assistance, July 1, 1945, to Dec. 31, 1976, gross and returned, by type and by program* [1]—Continued

[In millions of dollars and equivalents]

Type and program	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
OTHER ASSISTANCE (THROUGH NET ACCUMULATION OF FOREIGN CURRENCY CLAIMS)								
Net	2,000	−53	30	−247	−49	−213	−246	2,779
Farm product sales	14,996	(*)	5	1	5	75	164	14,745
Under Mutual Security Acts	2,031							2,031
Under Agricultural Trade Development and Assistance Act	12,922		(*)		5	74	164	12,679
Under Commodity Credit Corporation Charter Act	43	(*)	5	1	1	1	(*)	35
From 2d-stage operations (under Agricultural Trade Development and Assistance Act) [7]	4,332	129	184	2,213	356	270	175	1,006
Less currencies disbursed for grants, credits, and other uses	17,328	182	159	2,461	410	558	585	12,972
Under Mutual Security Acts	2,000	1	1	(*)	(*)	1	1	1,997
For economic grants and credits in recipient's currency	1,553	1	1	(*)	(*)	(*)	1	1,550
Other	447	(*)	(*)	(*)	(*)	(*)	(*)	447
Under Agricultural Trade Development and Assistance Act	15,284	181	153	2,460	409	556	584	10,940
For economic grants and credits in recipient's currency	11,772	41	20	2,318	207	317	374	8,494
Other	3,512	140	133	142	202	239	210	2,446
Under Commodity Credit Corporation Charter Act: Other than for grants and credits	43	(*)	5	1	1	1	(*)	35

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*Less than $500,000 (plus or minus).

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note.

[2] New credits do not include $3,682,954,000 representing settlements for postwar relief and other grants under agreements. New grants have not been adjusted for any part of these settlements.

[3] Includes contributions to mutual special weapons projects.

[4] Data not available, 1963–76; to be revised.

[5] Includes donations through United Nations Children's Fund, United Nations Relief and Works Agency for Palestine Refugees, and World Food Program.

[6] Also includes some dollars deposited by foreign governments in payment of foreign currencies owed to the United States.

[7] Includes foreign currencies acquired from triangular trade operations and principal and interest collections on credits, originally extended under Public Law 83–480, which—since enactment of Public Law 87–128—are available for the same purposes as Public Law 83–480 currencies.

Source: Compiled by Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

TABLE B-3.—*Summary of major U.S. Government net foreign assistance, July 1, 1945, to Dec. 31, 1976, by area, type, and country*[1]

[In millions of dollars and equivalents]

Area, type, and country	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
Total, all areas[2]	174,134	6,838	8,027	6,785	6,431	7,971	7,221	130,860
Military supplies and services[3]	65,686	1,354	2,901	2,842	2,852	4,527	3,580	47,631
Other[4]	108,448	5,485	5,126	3,943	3,580	3,444	3,642	83,229
Total, Europe	56,461	650	513	494	780	347	291	53,387
Total, Western Europe	54,472	484	570	596	410	278	292	51,841
Military supplies and services[2]	25,393	102	100	279	323	281	333	23,974
Other[4]	29,079	381	470	318	88	–4	–41	27,867
Austria	1,089	2	–2	–2	–2	(*)	9	1,085
Belgium and Luxembourg	670	–2	18	15	3	–6	–9	651
Cyprus	60	21	14	1	–1	1	1	24
Denmark	299	–4	15	10	24	–1	–5	260
Finland	51	10	7	(*)	–6	–2	(*)	42
France	4,107	–41	–15	–11	12	32	7	4,123
Germany	2,922	–22	33	46	8	3	6	2,849
Greece	1,996	121	112	65	43	–9	–10	1,673
Iceland	56	–3	3	–3	–3	–2	–2	66
Ireland	72	–6	–18	–15	–10	–5	–20	146
Italy	2,982	–13	–13	–8	11	–15	–7	3,028
Malta	64	14	15	5	11	12	1	6
Netherlands	957	14	56	34	52	38	2	761
Norway	533	30	92	95	38	42	6	229
Portugal	287	113	15	7	11	16	–6	131
San Marino	1							1
Spain	1,315	18	94	91	106	–16	–17	1,040
Sweden	115	11	4	6	–1	–3	–1	99
Switzerland	86	8	28	14	24	12	1	(*)
Turkey	2,886	57	73	121	65	164	109	2,297
United Kingdom	5,823	–18	–89	–162	–132	–208	–138	6,570
Yugoslavia	2,065	78	39	–27	–44	55	26	1,939
European Atomic Energy Community	39	–5	–6	–5	–1	2	(*)	54
European Coal and Steel Community	19	–6	–6	–5	–5	–5	–5	51
European Payments Union	6				–118	–114		238
Other and unspecified Western Europe	580	4	1	48	3	6	14	504
Total, other Europe (other than military)[4]	1,990	166	–58	–102	369	70	–2	1,546
Albania	20							20
Czechoslovakia	191							191
East Germany	17							17
Hungary	17	(*)	–1	–1	1	(*)	–1	20
Poland	1,047	142	9	–24	11	–22	–13	945
Romania	114	22	20	27	–1	–10	23	33
U.S.S.R.	583	2	–86	–104	359	102	–10	320
Total, Africa	8,073	765	515	508	289	265	474	5,258
Military supplies and services	421	29	19	16	11	12	20	314
Other[4]	7,652	736	496	492	278	253	454	4,943
Algeria	465	67	41	115	50	2	12	178
Angola	5	–1	(*)	–1	1	(*)	–1	6

See footnotes at end of table.

TABLE B-3.—*Summary of major U.S. Government net foreign assistance, July 1, 1945, to Dec. 31, 1976, by area, type, and country*[1]—Continued

[In millions of dollars and equivalents]

Area, type, and country	Total (31½ years)	Calendar years 1976	1975	1974	1973	1972	1971	July 1, 1945, to Dec. 31, 1970
Benin	26	7	2	3	(*)	1	1	11
Botswana	43	8	8	4	8	4	2	10
Burundi	10	2	1	(*)	(*)	(*)	1	6
Cameroon	71	5	5	1	3	12	6	38
Cape Verde	5	4	1	....	....	....	....	....
Central African Empire	12	1	1	1	1	3	(*)	5
Chad	31	6	5	8	1	1	(*)	10
Congo	11	(*)	1	1	....	(*)	(*)	9
Egypt	1,551	231	87	27	−20	−6	106	1,127
Ethiopia	328	34	30	26	18	14	21	185
Gabon	23	7	4	4	2	(*)	(*)	7
Gambia	10	2	1	1	2	1	1	2
Ghana	283	16	6	1	6	15	15	223
Guinea	135	9	9	6	8	3	7	93
Guinea-Bissau	1	1	1	....	....	....	....	....
Ivory Coast	72	(*)	1	3	16	8	6	38
Kenya	134	17	9	9	6	6	19	68
Lesotho	33	6	4	5	3	3	4	9
Liberia	256	15	(*)	−2	−3	2	5	240
Libya	206	....	....	....	(*)	(*)	(*)	206
Madagascar	21	1	2	1	(*)	1	2	14
Malawi	41	5	5	4	1	2	3	21
Mali	72	5	11	22	8	3	4	19
Mauritania	30	9	[illegible]	9	4	2	1	2
Mauritius	14	(*)	2	4	1	3	1	2
Morocco	938	105	8	30	13	21	70	690
Mozambique	13	12	1	....	....	(*)	(*)	(*)
Niger	78	9	11	29	10	2	1	16
Nigeria	373	3	8	10	24	29	48	251
Rwanda	17	2	3	1	(*)	1	1	9
Senegal	72	8	8	7	8	2	4	33
Seychelles	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Sierra Leone	62	3	4	3	2	3	4	43
Somalia	92	3	6	(*)	1	3	7	72
South Africa	−92	(*)	(*)	....	....	....	(*)	−92
Sudan	134	−4	13	7	16	10	−1	94
Swaziland	9	1	2	1	2	2	1	1
Tanzania	197	37	37	11	8	8	11	84
Togo	30	3	3	3	2	1	2	15
Tunisia	751	13	12	17	12	36	37	623
Uganda	45	(*)	(*)	1	2	4	5	33
Upper Volta	54	8	6	11	7	4	4	14
Zaire	605	37	97	63	11	20	13	364
Zambia	43	8	5	9	8	1	6	8
East African Common Services Organization	2	(*)	(*)	(*)	(*)	(*)	(*)	2
Other and unspecified Africa	343	30	36	33	36	25	29	154
Total, Western Hemisphere	13,567	520	806	736	490	459	404	10,151
Military supplies and services	1,339	16	26	24	25	26	25	1,198
Other[4]	12,227	504	781	713	465	433	379	8,953
Antigua	1	....	(*)	(*)	....	(*)	(*)	2
Argentina	396	20	−4	−4	−11	5	22	368

See footnotes at end of table.

TABLE B–3.—*Summary of major U.S. Government net foreign assistance, July 1, 1945, to Dec. 31, 1976, by area, type, and country* [1]—Continued

[In millions of dollars and equivalents]

Area, type, and country	Total (31½ years)	Calendar years 1976	1975	1974	1973	1972	1971	July 1, 1945, to Dec. 31, 1970
Bahamas	28	–1	21	–1	–2	–3	–11	25
Barbados	3	2	1	(*)	(*)	(*)	(*)	(*)
Belize	7	(*)	(*)	1	(*)	(*)	(*)	5
Bermuda	10	–8	–5	–2	11	13		
Bolivia	622	30	12	26	10	38	18	488
Brazil	3,273	145	193	263	79	53	98	2,440
Cayman Islands	11	–1	2	10				
Chile	1,356	–71	128	84	28	16	–16	1,187
Colombia	1,233	21	36	45	95	65	83	888
Costa Rica	207	7	10	9	10	11	10	150
Cuba	41							41
Dominica	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Dominican Republic	542	29	36	10	19	25	21	402
Ecuador	263	15	7	7	11	9	10	205
El Salvador	153	9	7	4	9	9	7	109
Grenada	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Guatemala	343	43	21	17	15	17	11	219
Guyana	86	7	16	5	4	6	9	40
Haiti	157	18	11	3	4	3	3	115
Honduras	178	18	24	13	10	10	8	95
Jamaica	145	8	25	22	18	7	14	50
Mexico	741	34	70	95	–4	–10	–18	575
Netherlands Antilles	3			3		(*)	(*)	(*)
Nicaragua	221	17	13	18	20	6	13	135
Panama	351	36	24	29	42	20	13	187
Paraguay	138	3	7	7	5	7	12	98
Peru	538	43	50	–19	43	48	16	356
Surinam	9	(*)	1	(*)	(*)	(*)	(*)	9
Trinidad and Tobago	51	–4	(*)	6	1	3	–1	47
Uruguay	153	5	(*)	1	5	19	8	115
Venezuela	238	–22	–19	–13	–16	3	–19	323
Central American Bank for Economic Integration	141	14	14	12	14	15	23	49
Central American Monetary Stabilization Fund	10		10					
Caribbean Development Bank	14	6	5	2	1			
Andean Development Corporation	4	4	(*)	(*)				
Other and unspecified Western Hemisphere	558	76	63	60	49	37	46	227
Total, Asia	86,634	4,168	5,444	4,235	4,340	6,244	5,455	56,748
Military supplies and services	38,075	1,200	2,750	2,518	2,490	4,203	3,195	21,718
Other [4]	48,559	2,968	2,694	1,717	1,849	2,041	2,260	35,030
Afghanistan	458	20	18	9	30	22	20	338
Bangladesh	779	78	380	105	137	79		
Brunei	(*)	–20		(*)	4	3	12	
Burma	112	–1	–1	(*)	1	3	3	108
Cambodia [3]	848	(*)	78	288	128	72	24	257
China (Taiwan)	2,779	145	191	119	39	26	14	2,245
Hong Kong	85	6	19	13	(*)	3	(*)	43
India	9,107	120	243	–182	67	112	469	8,276
Indonesia	2,305	333	165	125	160	159	135	1,229

See footnotes at end of table.

TABLE B-3.—*Summary of major U.S. Government net foreign assistance, July 1, 1945, to Dec. 31, 1976, by area, type, and country* [1]—Continued

[In millions of dollars and equivalents]

Area, type, and country	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
Iran	1,285	–109	–103	37	221	72	196	971
Iraq	37	–2	–2	–2	–2	–2	(*)	46
Israel	4,455	1,405	803	199	238	249	377	1,185
Japan and Ryukyu Islands	2,533	64	10	2	–230	–60	–60	2,806
Jordan	1,026	90	63	57	64	107	48	598
Korea	6,235	344	314	63	214	221	194	4,886
Kuwait	...	...	–5	–10	–10	–10	...	35
Laos [5]	908	...	16	36	54	48	56	697
Lebanon	176	7	37	22	4	5	–1	103
Macao	5	(*)	(*)	...	(*)	(*)	(*)	5
Malaysia	130	15	3	19	–5	15	–1	84
Nepal	208	16	8	10	12	13	9	140
Pakistan	4,891	252	134	122	134	154	216	3,878
Philippines	1,736	109	77	43	71	70	55	1,312
Saudi Arabia	21	–12	–11	–21	–17	–4	–13	98
Singapore	93	16	15	26	34	1	(*)	2
Sri Lanka	260	21	20	2	24	20	14	159
Syria	96	23	18	(*)	(*)	–1	(*)	56
Thailand	651	7	11	19	21	19	29	544
Vietnam [5]	6,690	(*)	164	585	437	539	427	4,537
Yemen (Aden)	3	(*)	1	1	1	(*)	(*)	1
Yemen (Sana)	71	8	6	8	2	(*)	(*)	48
Asian Development Bank	1	...	...	...	...	...	(*)	1
Other and unspecified Asia	576	31	23	20	16	106	36	345
Total, Oceania (other than military) [4]	1,079	47	88	30	18	97	90	708
Australia	231	–46	–23	–62	–59	39	26	355
Fiji	6	1	1	1	1	1	1	2
New Caledonia	1	...	...	...	...	...	...	1
New Zealand	112	13	30	16	8	–5	(*)	50
Papua New Guinea	18	–12	(*)	(*)	3	5	10	13
Solomon Islands	2	(*)	(*)	(*)	(*)	(*)	(*)	1
Tonga	5	(*)	(*)	1	1	(*)	(*)	2
Trust Territory of the Pacific Islands	696	89	79	73	64	57	53	282
Western Samoa	6	1	1	1	1	(*)	(*)	2
Other and unspecified Oceania	(*)	(*)	(*)	...	...	...	...	(*)
Canada	287	13	45	87	65	28	28	21
Military supplies and services	9	...	...	...	...	...	...	9
Other	278	13	45	87	65	28	28	12
Other international organizations and unspecified, all areas	8,033	677	615	696	449	531	479	4,587
Military supplies and services	449	6	6	6	3	5	6	417
Other [4]	7,584	670	609	690	447	526	473	4,169

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*Less than $500,000 (plus or minus).

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note. Military grant aid is shown by area only; country detail is shown for other net grants and for net credits.

[2] Does not include $5,111,770,000 investment in international financial institutions, shown in tables B-1 and B-2.

[3] Includes contributions to the multilateral-construction program of the North Atlantic Treaty Organization and contributions to mutual special weapons projects.

[4] Includes development assistance, technical assistance, and relief.

[5] Separate detail data for Cambodia, Laos, and Vietnam became available during 1954. For earlier periods data for Indochina are included in "Unspecified Asia."

Source: Compiled by Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

TABLE B–4.—*Summary of U.S. Government net foreign grants, July 1, 1945, to Dec. 31, 1976, by area, type, and country*[1]

[In millions of dollars and equivalents]

Area, type, and country	Total (31½ years)	Calendar years 1976	1975	1974	1973	1972	1971	July 1, 1945, to Dec. 31, 1970
Total, all areas	136,243	3,620	5,148	7,380	4,790	6,700	5,622	102,984
Military supplies and services[2]	65,686	1,354	2,901	2,842	2,852	4,527	3,580	47,631
Other[3]	70,557	2,266	2,247	4,538	1,938	2,173	2,043	55,353
Total, Europe	48,386	166	136	295	234	205	355	46,995
Total, Western Europe	47,264	162	136	294	233	204	350	45,884
Military supplies and services[2]	25,393	102	100	279	323	281	333	23,974
Other[3]	21,872	60	36	15	–89	–77	17	21,910
Austria	1,045							1,045
Belgium and Luxembourg	581							581
Cyprus	56	17	14	1	1	2	1	19
Denmark	234		(*)					234
Finland	4							4
France	4,183							4,183
Germany	3,831							3,831
Greece	1,472	(*)	(*)	(*)	(*)	(*)	(*)	1,471
Iceland	34							34
Ireland	17							17
Italy	2,773	1			(*)	(*)	(*)	2,772
Malta	59	10	14	5	12	12	(*)	6
Netherlands	844							844
Norway	217							217
Portugal	86	30	(*)					56
San Marino	1							1
Spain	393	1	3	3	3			384
Sweden	87							87
Turkey	1,151	1	5	6	13	22	15	1,089
United Kingdom	3,277							3,277
Yugoslavia	1,047			(*)		(*)	(*)	1,047
European Payments Union	6				–118	–114		238
Other and unspecified Western Europe	474	(*)	(*)	(*)	1	(*)	(*)	473
Total, other Europe (other than military)[3]	1,121	4	(*)	1	1	1	4	1,110
Albania	20							20
Czechoslovakia	186							186
East Germany	17							17
Hungary	17						(*)	17
Poland	444	4	(*)	1	1	1		437
Romania	10				(*)		4	6
U.S.S.R.	426							426
Total, Africa	4,326	309	266	289	172	151	186	2,953
Military supplies and services	421	29	19	16	11	12	20	314
Other[3]	3,905	280	247	273	161	139	166	2,639
Algeria	182	3	8	1	(*)	(*)	(*)	169
Benin	16	1	1	1	1	1	1	11
Botswana	24	4	3	1	2	2	2	10
Burundi	10	2	1	(*)	(*)	(*)	1	6
Cameroon	33	5	5	1	1	1	1	18

See footnotes at end of table.

TABLE B–4.—*Summary of U.S. Government net foreign grants, July 1, 1945, to Dec. 31, 1976, by area, type, and country* [1]—Continued

[In millions of dollars and equivalents]

Area, type, and country	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
Cape Verde	5	4	1					
Central African Empire	9	1	1	(*)	(*)	2	(*)	5
Chad	31	6	5	8	1	1	(*)	10
Congo	11	(*)	1	1		(*)	(*)	9
Egypt	391	49	27	42	4	3	2	263
Ethiopia	199	11	11	18	10	7	7	137
Gabon	8	(*)	(*)	(*)	(*)	(*)	(*)	7
Gambia	10	2	1	1	2	1	1	2
Ghana	86	12	8	5	6	5	7	42
Guinea	51	1	1	2	(*)	1	1	45
Guinea-Bissau	1	1	1					
Ivory Coast	24	1	2	2	1	2	2	14
Kenya	87	7	6	4	5	5	6	55
Lesotho	33	6	4	5	3	3	4	9
Liberia	147	9	7	4	6	7	8	105
Libya	206				(*)	(*)	(*)	206
Madagascar	15	1	1	(*)	(*)	(*)	1	11
Malawi	21	1	1	(*)	(*)	1	1	18
Mali	68	5	11	22	7	2	4	18
Mauritania	26	6	3	9	4	2	1	2
Mauritius	14	(*)	2	4	1	3	1	2
Morocco	399	22	16	27	13	17	22	282
Mozambique	11	10	1					
Niger	75	9	11	29	10	2	1	13
Nigeria	271	4	7	8	9	13	19	212
Rwanda	17	2	3	1	(*)	1	1	9
Senegal	66	8	6	6	8	3	4	31
Seychelles	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Sierra Leone	50	4	4	3	2	3	4	31
Somalia	76	3	6	(*)	(*)	(*)	5	62
South Africa	−92							−92
Sudan	86	1	10	3	3	2	(*)	69
Swaziland	7	1	1	1	1	1	1	1
Tanzania	127	28	20	9	5	4	4	57
Togo	28	3	3	2	2	1	2	15
Tunisia	420	8	12	10	12	8	12	357
Uganda	34	(*)	1	1	2	3	3	25
Upper Volta	54	8	6	11	7	4	4	14
Zaire	258	4	3	4	4	4	5	235
Zambia	6	(*)	(*)	(*)	(*)	(*)	(*)	5
Other and unspecified Africa	304	27	27	26	28	26	29	141
Total, Western Hemisphere	5,490	248	234	200	207	202	239	4,161
Military supplies and services	1,339	16	26	24	25	26	25	1,198
Other [3]	4,151	232	209	176	181	176	214	2,962
Antigua	1			(*)		(*)	(*)	1
Argentina	21	(*)	(*)	(*)	(*)	(*)	1	20
Barbados	2	1	1	(*)	(*)	(*)	(*)	(*)
Belize	7	(*)	(*)	(*)	(*)	(*)	(*)	5
Bolivia	341	10	8	7	6	7	7	296
Brazil	607	8	13	16	23	25	38	482

See footnotes at end of table.

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TABLE B-4.—*Summary of U.S. Government net foreign grants, July 1, 1945, to Dec. 31, 1976, by area, type, and country*[1]—Continued

[In millions of dollars and equivalents]

Area, type, and country	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
Chile	254	16	11	6	5	5	10	201
Colombia	301	17	18	18	14	17	24	193
Costa Rica	118	3	3	4	5	6	6	90
Cuba	5	...	...	...	...	...	...	5
Dominica	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Dominican Republic	263	13	11	7	7	9	13	204
Ecuador	142	5	8	8	9	7	8	96
El Salvador	81	4	4	3	4	4	5	57
Grenada	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Guatemala	235	22	7	6	6	9	8	177
Guyana	27	(*)	1	1	1	2	2	20
Haiti	127	12	9	5	4	4	4	88
Honduras	96	6	12	6	6	5	5	57
Jamaica	50	2	2	3	3	4	4	33
Mexico	160	1	2	5	1	1	(*)	149
Nicaragua	94	4	4	4	8	4	4	65
Panama	156	19	13	7	7	6	6	98
Paraguay	81	3	4	2	7	5	4	55
Peru	238	11	12	8	12	11	16	168
Surinam	5	...	...	...	(*)	(*)	(*)	4
Trinidad and Tobago	35	...	...	(*)	(*)	(*)	(*)	34
Uruguay	32	1	1	1	2	3	2	22
Venezuela	67	1	1	1	2	3	3	55
Other and unspecified Western Hemisphere	605	74	62	58	46	37	43	285
Total, Asia	69,336	2,124	3,810	5,819	3,657	5,547	4,304	44,075
Military supplies and services	38,075	1,200	2,750	2,518	2,490	4,203	3,195	21,718
Other[3]	31,261	924	1,059	3,301	1,167	1,345	1,109	22,357
Afghanistan	354	9	12	6	13	21	10	283
Bangladesh	319	8	47	64	122	79	...	...
Burma	60	2	(*)	(*)	(*)	1	1	56
Cambodia[4]	638	...	44	156	99	62	20	257
China (Taiwan)	1,901	(*)	(*)	(*)	4	10	6	1,881
Hong Kong	43	(*)	(*)	(*)	(*)	(*)	(*)	43
India	4,693	140	170	2,138	108	214	177	1,747
Indonesia	424	11	15	26	14	18	13	325
Iran	461	1	1	1	1	2	1	453
Iraq	31	...	...	...	(*)	(*)	1	30
Israel	1,578	505	423	98	115	62	6	370
Japan and Ryukyu Islands	2,634	...	−2	−2	−2	−1	8	2,634
Jordan	918	71	67	45	54	74	39	567
Korea	4,482	4	5	14	14	41	48	4,356
Laos[4]	908	...	16	36	54	48	56	697
Lebanon	109	1	1	16	3	2	1	84
Macao	5	(*)	(*)	...	(*)	(*)	(*)	5
Malaysia	58	3	2	4	4	3	4	39
Nepal	191	8	8	6	12	13	9	137
Pakistan	2,020	62	24	24	31	15	73	1,791
Philippines	1,286	43	40	38	37	30	16	1,082
Saudi Arabia	31	...	...	(*)	(*)	(*)	(*)	31

See footnotes at end of table.

TABLE B-4.—*Summary of U.S. Government net foreign grants, July 1, 1945, to Dec. 31, 1976, by area, type, and country*[1]—Continued

[In millions of dollars and equivalents]

Area, type, and country	Total (31½ years)	Calendar years 1976	1975	1974	1973	1972	1971	July 1, 1945, to Dec. 31, 1970
Singapore	3	1	(*)	(*)	(*)	(*)	(*)	2
Sri Lanka	110	6	6	5	2	2	6	83
Syria	37	2	(*)	....	(*)	(*)	(*)	34
Thailand	566	8	13	12	20	23	30	460
Vietnam[4]	6,736	....	138	585	444	523	547	4,498
Yemen (Aden)	3	(*)	1	1	1	(*)	(*)	1
Yemen (Sana)	71	8	6	8	2	(*)	(*)	48
Asian Development Bank	1						(*)	1
Other and unspecified Asia	590	31	23	20	16	104	36	361
Total, Oceania (other than military)[3]	710	91	81	76	66	58	54	283
Australia	−7							−7
Fiji	6	1	1	1	1	1	1	2
New Zealand	2							2
Solomon Islands	2	(*)	(*)	(*)	(*)	(*)	(*)	1
Tonga	5	(*)	(*)	1	1	(*)	(*)	2
Trust Territory of the Pacific Islands	696	89	79	73	64	57	53	282
Western Samoa	6	1	1	1	1	(*)	(*)	2
Other and unspecified Oceania	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Canada (military supplies and services)	9							9
Other international organizations and unspecified, all areas	7,986	681	621	701	454	536	484	4,508
Military supplies and services	449	6	6	6	3	5	6	417
Other[3]	7,537	675	615	696	452	531	478	4,090

*Less than $500,000 (plus or minus).

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note. Military grant aid is shown by area only.

[2] Includes contributions to the multilateral-construction program of the North Atlantic Treaty Organization and contributions to mutual special weapons projects.

[3] Includes development assistance, technical assistance, and relief.

[4] Separate detail data for Cambodia, Laos, and Vietnam became available during 1954. For earlier periods data for Indochina are included in "Unspecified Asia."

NOTE.—Net grants have not been adjusted for $3,682,954,000, representing settlements for postwar relief and other grants under agreements; see footnote 4 to table B-1 for additional details.

Source: Compiled by Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

TABLE B–5.—*Summary of U.S. Government net foreign credits, July 1, 1945, to Dec. 31, 1976, by area and country* [1]

[In millions of dollars and equivalents]

Area and country	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
Total, all areas	35,891	3,272	2,849	–348	1,690	1,484	1,845	25,097
Total, Europe	7,472	503	400	220	564	174	–39	5,650
Total, Western Europe	6,890	319	429	303	179	77	–57	5,640
Austria	45	2	–2	–2	–2	(*)	9	40
Belgium and Luxembourg	89	–2	18	15	3	–6	–8	69
Cyprus	4	3	(*)	(*)	–1	–1	(*)	4
Denmark	65	–4	15	10	24	–1	–5	27
Finland	40	10	7	(*)	–6	–2	(*)	31
France	–78	–41	–15	–11	12	32	7	–62
Germany	–908	–22	33	46	8	3	6	–981
Greece	524	121	112	65	43	–9	–11	202
Iceland	22	–3	3	–3	–3	–2	–2	32
Ireland	54	–6	–18	–15	–10	–5	–20	128
Italy	209	–14	–13	–8	11	–15	–7	256
Malta	5	4	1	(*)	–1	(*)	1	...
Netherlands	112	14	56	34	52	38	2	–83
Norway	316	30	92	95	38	42	6	12
Portugal	201	83	15	7	11	16	–6	75
Spain	837	16	91	89	103	–16	–18	572
Sweden	28	11	4	6	–1	–3	–1	12
Switzerland	86	8	28	14	24	12	...	...
Turkey	1,674	58	68	114	52	143	94	1,145
United Kingdom	2,546	–18	–89	–162	–132	–208	–138	3,292
Yugoslavia	854	74	34	–27	–42	56	26	732
European Atomic Energy Community	39	–5	–6	–5	–1	2	(*)	54
European Coal and Steel Community	19	–6	–6	–5	–5	–5	–5	51
Other and unspecified Western Europe	106	4	1	48	2	5	14	31
Total, other Europe	583	184	–29	–83	385	97	18	10
Czechoslovakia	5	...	...	...	...	...	...	5
Hungary	(*)	(*)	–1	–1	1	(*)	–1	2
Poland	318	160	37	–4	27	6	10	82
Romania	104	22	20	27	–1	–10	18	27
U.S.S.R.	156	2	–86	–104	359	102	–10	–106
Total, Africa	3,364	490	200	227	128	116	291	1,913
Algeria	284	64	33	114	50	2	12	9
Angola	5	–1	(*)	–1	1	(*)	–1	6
Benin	9	5	1	2	(*)	(*)	(*)	(*)
Botswana	20	5	4	3	6	2	...	...
Cameroon	38	(*)	(*)	(*)	3	12	5	20
Central African Empire	3	(*)	1	(*)	1	1	...	...
Egypt	839	216	13	–8	–21	–9	98	550
Ethiopia	129	24	19	8	8	8	14	48
Gabon	15	7	3	3	2	...	...	...
Ghana	194	5	–1	–4	(*)	12	13	169
Guinea	78	7	9	6	12	7	10	27
Ivory Coast	48	–1	–1	1	14	6	4	24
Kenya	47	9	3	6	1	1	13	14
Liberia	108	6	–7	–7	–10	–5	–4	135

See footnotes at end of table.

TABLE B-5.—*Summary of U.S. Government net foreign credits, July 1, 1945, to Dec. 31, 1976, by area and country*[1]—Continued

[In millions of dollars and equivalents]

Area and country	Total (31½ years)	Calendar years 1976	1975	1974	1973	1972	1971	July 1, 1945, to Dec. 31, 1970
Madagascar	6	....	1	(*)	(*)	(*)	1	3
Malawi	20	5	4	4	(*)	2	2	3
Mali	3	(*)	(*)	(*)	1	(*)	(*)	1
Mauritania	4	3	(*)	1	....	....	....	....
Morocco	533	81	–9	3	5	3	46	404
Mozambique	1	1	....	....	....	(*)	(*)	(*)
Niger	3	(*)	(*)	(*)	(*)	(*)	(*)	2
Nigeria	101	–1	(*)	2	15	16	29	40
Senegal	5	(*)	2	2	(*)	(*)	....	1
Sierra Leone	12	(*)	(*)	(*)	(*)	(*)	(*)	12
Somalia	16	(*)	(*)	(*)	1	3	2	10
Sudan	44	–4	4	5	14	8	–1	19
Swaziland	3	(*)	(*)	(*)	1	1	....	....
Tanzania	70	9	17	2	3	5	7	27
Togo	2	(*)	(*)	2	....	(*)	1	....
Tunisia	312	7	–4	4	–2	25	26	255
Uganda	11	....	(*)	(*)	(*)	1	2	9
Zaire	324	32	93	60	7	16	8	107
Zambia	37	7	5	9	8	(*)	5	3
East African Common Services Organization	2	(*)	(*)	(*)	(*)	(*)	(*)	2
Other and unspecified Africa	39	2	9	7	8	–1	(*)	13
Total, Western Hemisphere	7,814	272	572	538	287	257	166	5,723
Antigua	1	....	(*)	....	....	(*)	(*)	1
Argentina	368	20	–4	–4	–11	4	21	342
Bahamas	28	–1	21	–1	–2	–3	–11	24
Barbados	1	1	....	....	(*)	....	....	(*)
Bermuda	10	–8	–5	–2	11	13	....	....
Bolivia	280	20	3	20	4	31	12	190
Brazil	2,472	137	179	248	56	28	61	1,764
Cayman Islands	11	–1	2	10	....	....	....	....
Chile	1,078	–87	117	78	23	10	–26	963
Colombia	916	4	18	27	81	48	59	680
Costa Rica	89	4	6	5	5	5	3	60
Cuba	36	....	....	....	....	....	....	36
Dominican Republic	278	17	25	2	13	16	8	198
Ecuador	120	10	–1	–1	1	1	2	107
El Salvador	72	4	3	1	5	5	2	53
Guatemala	108	22	13	11	8	9	3	42
Guyana	59	6	15	4	2	4	7	20
Haiti	30	6	2	–2	–1	–1	–1	26
Honduras	82	13	12	7	3	5	3	39
Jamaica	96	6	23	19	15	4	11	17
Mexico	581	33	68	90	–6	–12	–19	425
Netherlands Antilles	3	....	....	3	....	(*)	(*)	(*)
Nicaragua	127	13	9	14	12	1	8	70
Panama	195	17	11	22	35	14	8	89
Paraguay	57	(*)	3	5	1	2	7	39
Peru	297	32	38	–28	31	37	(*)	186
Surinam	4	(*)	1	(*)	(*)	(*)	(*)	5

See footnotes at end of table.

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TABLE B-5.—*Summary of U.S. Government net foreign credits, July 1, 1945, to Dec. 31, 1976, by area and country*[1]—Continued

[In millions of dollars and equivalents]

Area and country	Total (31½ years)	Calendar years 1976	1975	1974	1973	1972	1971	July 1, 1945, to Dec. 31, 1970
Trinidad and Tobago	17	–4	(*)	6	1	2	–1	13
Uruguay	104	4	–1	(*)	3	16	5	76
Venezuela	171	–23	–20	–14	–19	(*)	–22	268
Central American Bank for Economic Integration	141	14	14	12	14	15	23	49
Central American Monetary Stabilization Fund	10		10					
Caribbean Development Bank	14	6	5	2	1			
Andean Development Corporation	4	4	(*)	(*)				
Other and unspecified Western Hemisphere	–46	3	1	2	2	(*)	3	–58
Total, Asia	16,546	2,044	1,631	–1,368	698	876	1,369	11,295
Afghanistan	101	11	6	4	17	1	10	51
Bangladesh	459	70	333	41	15			
Brunei	(*)	–20		(*)	4	3	12	
Burma	45	–2	–2	–1	(*)	2	2	45
Cambodia	207	(*)	34	133	31	9		
China (Taiwan)	876	145	191	119	36	21	7	357
Hong Kong	41	6	19	13		3		(*)
India	3,981	–13	79	–2,114	–36	45	382	5,640
Indonesia	1,658	321	149	99	147	141	121	681
Iran	825	–110	–104	36	220	70	195	517
Iraq	6	–2	–2	–2	–2	–2	–1	17
Israel	2,841	900	379	101	123	188	379	771
Japan and Ryukyu Islands	–101	64	12	4	–227	–57	–69	171
Jordan	108	19	–5	12	11	33	9	29
Korea	1,735	340	309	50	201	200	145	489
Kuwait			–5	–10	–10	–10		35
Lebanon	67	6	36	5	1	3	–3	18
Malaysia	71	12	1	15	–9	12	–5	45
Nepal	3	(*)	(*)	(*)	(*)	(*)	1	3
Pakistan	2,734	193	103	95	105	130	151	1,959
Philippines	441	66	37	5	34	41	38	219
Saudi Arabia	–10	–12	–11	–21	–17	–4	–13	67
Singapore	90	15	15	26	34	1	(*)	
Sri Lanka	148	15	14	–3	22	18	9	73
Syria	50	20	18	(*)	(*)	(*)	(*)	13
Thailand	84	–1	–2	7	1	–5	(*)	84
Vietnam	97	(*)	26	16	–1	31	–2	27
Other and unspecified Asia	–14	(*)	(*)			2		–16
Total, Oceania	368	–45	7	–46	–48	39	36	425
Australia	239	–46	–23	–62	–59	39	26	363
New Caledonia	1							1
New Zealand	110	13	30	16	8	–5	(*)	48
Papua New Guinea	18	–12			3	5	10	13
Other and unspecified Oceania	(*)							(*)
Canada	278	13	45	87	65	28	28	12

See footnotes at end of table.

TABLE B–5.—*Summary of U.S. Government net foreign credits, July 1, 1945, to Dec. 31, 1976, by area and country*[1]—Continued

[In millions of dollars and equivalents]

Area and country	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
Other international organizations:								
United Nations	47	–5	–6	–5	–5	–5	–5	79

*Less than $500,000 (plus or minus).

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note.

NOTE.—New credits do not include $3,682,954,000 representing settlements for postwar relief and other grants under agreements, including that for the reversion of the Ryukyu Islands to Japan. New grants have not been adjusted for any part of these settlements. For major countries, these amounted to: Germany, $1,000,000,000; Soviet Union, $838,595,000; Japan, $810,000,000; United Kingdom, $562,447,000; France, $353,300,000; and Netherlands, $47,160,000. Although settlements have not been reached with China, for statistical convenience the amount of postwar lend-lease credits ($50,345,000) is included in the total of "settlements" noted here, and thus reported in grants rather than credits.

Source: Compiled by Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

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Table B-5A.—*Summary of U.S. Government foreign credits utilized, July 1, 1945, to Dec. 31, 1976, by area and country*[1]

[In millions of dollars and equivalents]

Area and country	Total (31½ years)	Calendar years 1976	1975	1974	1973	1972	1971	July 1, 1945, to Dec. 31, 1970
Total, all areas	70,711	5,823	5,293	4,468	4,252	3,534	3,935	43,406
Total, Europe	20,722	1,177	1,206	1,047	1,243	831	569	14,649
Total, Western Europe	18,990	800	992	889	737	674	507	14,392
Austria	167	6	1	2	(*)	4	16	136
Belgium and Luxembourg	351	3	24	22	11	2	4	285
Cyprus	8	3	...	...	...	...	1	4
Denmark	114	1	16	13	25	...	2	57
Finland	208	17	12	4	2	5	10	158
France	2,380	1	21	20	43	62	34	2,199
Germany	524	...	51	54	14	15	10	379
Greece	874	151	139	94	71	18	17	385
Iceland	61	(*)	6	1	1	1	1	51
Ireland	180	8	−2	3	...	1	8	161
Italy	1,304	14	25	37	56	40	64	1,068
Malta	6	4	1	...	(*)	(*)	1	...
Netherlands	600	19	58	36	53	39	2	393
Norway	486	61	96	98	41	45	9	137
Portugal	340	90	25	17	21	23	2	161
Spain	1,533	67	150	157	162	68	39	890
Sweden	67	12	6	8	2	...	...	39
Switzerland	93	10	31	15	25	12	...	...
Turkey	2,031	107	106	145	73	170	116	1,315
United Kingdom	5,718	80	94	35	68	36	65	5,338
Yugoslavia	1,563	128	118	74	54	120	83	986
European Atomic Energy Community	108	...	(*)	−2	10	5	7	88
European Coal and Steel Community	100	...	...	...	...	...	...	100
North Atlantic Treaty Organization	9	...	...	...	...	...	(*)	9
Other and unspecified Western Europe	166	18	10	56	6	8	17	51
Total, Other Europe	1,732	377	215	158	506	157	62	257
Czechoslovakia	13	...	...	...	...	...	...	13
Hungary	18	...	...	...	1	...	...	17
Poland	631	193	72	41	60	31	34	200
Romania	204	42	35	44	20	8	28	27
U.S.S.R.	865	141	108	73	426	118	...	...
Total, Africa	4,657	629	396	348	238	212	393	2,439
Algeria	315	76	38	118	53	5	13	12
Angola	11	...	1	(*)	2	1	...	7
Benin	10	6	1	2	(*)	(*)	(*)	(*)
Botswana	20	5	4	3	6	2	...	...
Cameroon	41	1	1	(*)	3	12	5	20
Central African Empire	3	(*)	1	(*)	1	1	...	...
Egypt	1,187	266	118	25	3	19	140	617
Ethiopia	178	28	22	12	11	10	16	79
Gabon	15	7	3	3	2	...	...	...
Ghana	278	10	6	3	11	22	26	200
Guinea	87	10	11	7	13	7	11	29
Ivory Coast	60	2	2	4	15	7	4	27
Kenya	59	12	5	7	1	2	13	19

See footnotes at end of table.

TABLE B–5A.—*Summary of U.S. Government foreign credits utilized, July 1, 1945, to Dec. 31, 1976, by area and country* [1]—Continued

[In millions of dollars and equivalents]

Area and country	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
Liberia	227	15	6	5	1	5	6	189
Libya	7							7
Madagascar	6		1	(*)	(*)	(*)	1	3
Malawi	20	5	4	4	(*)	2	2	3
Mali	3	(*)	(*)	(*)	1	(*)	(*)	1
Mauritania	4	3		1				
Morocco	732	104	13	31	38	28	65	452
Mozambique	2	1						(*)
Niger	3	(*)	(*)	(*)	(*)	(*)	(*)	2
Nigeria	115	1	3	4	16	16	29	45
Senegal	6	(*)	2	2	(*)	(*)	(*)	1
Sierra Leone	15		(*)	(*)		(*)	(*)	15
Somalia	17	(*)	(*)	(*)	1	3	2	11
South Africa	154	(*)	(*)					154
Sudan	70	1	11	13	17	8	(*)	21
Swaziland	3	(*)	(*)	(*)	1	1		
Tanzania	73	10	17	3	4	5	7	29
Togo	2			2		(*)	1	
Tunisia	394	18	7	15	10	34	33	279
Uganda	11			(*)	(*)	1	2	9
Zaire	355	37	100	65	11	20	11	111
Zambia	58	9	6	10	9	2	6	17
East African Common Services Organization	3							3
Other and unspecified Africa	112	4	12	9	10		1	77
Total, Western Hemisphere	14,424	829	1,119	1,202	650	557	522	9,545
Antigua	2							2
Argentina	1,115	59	42	36	29	48	60	840
Bahamas	55	1	23	2				30
Barbados	1	1			(*)			(*)
Bermuda	28			2	13	13		
Bolivia	340	31	10	26	9	35	16	212
Brazil	4,243	250	300	351	165	117	160	2,899
Cayman Islands	14		4	10				
Chile	2,070	40	251	370	30	14	23	1,343
Colombia	1,372	40	40	50	102	64	77	1,000
Costa Rica	145	7	10	9	8	10	7	94
Cuba	40							40
Dominican Republic	362	32	36	15	21	23	14	221
Ecuador	229	18	6	7	10	11	9	169
El Salvador	101	8	6	3	7	7	3	67
Guatemala	155	26	18	16	14	12	6	62
Guyana	60	7	15	4	2	4	7	20
Haiti	47	8	3	(*)	(*)	(*)	(*)	35
Honduras	105	15	16	9	5	6	4	49
Jamaica	135	9	26	22	18	6	12	41
Mexico	1,550	86	122	137	50	35	31	1,090
Netherlands Antilles	3			3				(*)
Nicaragua	169	17	12	18	15	4	11	93
Panama	268	31	19	27	41	19	14	115

See footnotes at end of table.

TABLE B-5A.—*Summary of U.S. Government foreign credits utilized, July 1, 1945, to Dec. 31, 1976, by area and country*[1]—Continued

[In millions of dollars and equivalents]

Area and country	Total (31½ years)	Calendar years 1976	1975	1974	1973	1972	1971	July 1, 1945, to Dec. 31, 1970
Paraguay	92	3	6	7	3	4	9	59
Peru	779	77	91	23	66	57	12	453
Surinam	7		2					5
Trinidad and Tobago	40	1	2	8	2	3	1	23
Uruguay	144	8	3	3	6	19	7	97
Venezuela	565	27	22	27	15	29	10	435
Central American Bank for Economic Integration	148	16	15	13	14	16	24	50
Central American Monetary Stabilization Fund	10		10					
Caribbean Development Bank	14	6	5	2	1			
Andean Development Corporation	4	4	(*)	(*)				
Other and unspecified Western Hemisphere	16	3	1	2	2	(*)	3	4
Total, Asia	28,917	3,124	2,423	1,726	1,930	1,803	2,293	15,617
Afghanistan	149	14	10	7	20	5	13	80
Bangladesh	549	160	333	41	15			
Brunei	20			(*)	4	3	12	
Burma	61		(*)	(*)	1	3	2	53
Cambodia	286	(*)	34	186	55	11		
China (Taiwan)	1,386	209	233	163	79	59	49	594
Hong Kong	44	8	21	13		3		(*)
India	7,355	84	190	74	81	145	476	6,306
Indonesia	2,090	341	163	109	159	150	310	859
Iran	1,865	1	20	168	337	173	287	878
Iraq	27					(*)	1	26
Israel	3,854	1,058	464	188	221	321	455	1,149
Japan and Ryukyu Islands	2,984	204	176	149	217	223	217	1,798
Jordan	162	34	10	18	15	33	11	41
Korea	2,275	484	396	131	264	273	193	533
Kuwait	50							50
Lebanon	99	10	39	9	3	7	2	28
Malaysia	151	19	10	24	3	20	3	71
Nepal	4						1	4
Pakistan	3,234	319	159	132	137	168	172	2,147
Philippines	947	109	78	40	100	96	67	456
Saudi Arabia	266	(*)	(*)	1	2	23	6	234
Singapore	93	17	16	26	34	1	(*)	
Sri Lanka	184	25	23	7	25	19	10	76
Syria	57	24	18					15
Thailand	168	5	5	14	9	2	6	128
Vietnam	556	(*)	27	226	148	64		91
Other and unspecified Asia	2		(*)			2		
Total, Oceania	1,314	35	84	45	116	99	130	804
Australia	1,066	13	45	20	96	92	112	689
New Caledonia	2							2
New Zealand	214	22	39	26	17	2	8	100
Papua New Guinea	30				3	5	10	13
Trust Territory of the Pacific Islands	1							1

See footnotes at end of table.

TABLE B-5A.—*Summary of U.S. Government foreign credits utilized, July 1, 1945, to Dec. 31, 1976, by area and country* [1]—Continued

[In millions of dollars and equivalents]

Area and country	Total (31½ years)	Calendar years 1976	1975	1974	1973	1972	1971	July 1, 1945, to Dec. 31, 1970
Canada	535	29	64	99	74	32	28	208
Other international organizations:								
United Nations	141							141

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*Less than $500,000.

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note.

NOTE.—New credits do not include $3,682,954,000 representing settlements for postwar relief and other grants under agreements, including that for the reversion of the Ryukyu Islands to Japan. New grants have not been adjusted for any part of these settlements. For major countries, these amounted to: Germany, $1,000,000,000; Soviet Union, $838,595,000; Japan, $810,000,000; United Kingdom, $562,447,000; France, $353,300,000; and Netherlands, $47,160,000. Although settlements have not been reached with China, for statistical convenience the amount of postwar lend-lease credits ($50,345,000) is included in the total of "settlements" noted here, and thus reported in grants rather than credits.

Source: Compiled by Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

TABLE B–5B.—*Summary of U.S. Government foreign credit repayments, July 1, 1945, to Dec. 31, 1976, by area and country* [1]

[In millions of dollars and equivalents]

Area and country	Total (31½ years)	Calendar years 1976	1975	1974	1973	1972	1971	July 1, 1945, to Dec. 31, 1970
Total, all areas	34,820	2,550	2,444	4,816	2,562	2,051	2,090	18,307
Total, Europe	13,250	674	806	827	679	657	607	8,999
Total, Western Europe	12,101	481	563	587	558	597	564	8,752
Austria	122	3	4	5	2	4	7	96
Belgium and Luxembourg	262	5	6	7	8	8	11	216
Cyprus	4	(*)	(*)	(*)	1	1	1	(*)
Denmark	49	5	1	3	1	1	7	30
Finland	168	7	5	4	8	7	9	127
France	2,458	41	36	31	31	29	28	2,261
Germany	1,432	22	18	8	6	13	4	1,360
Greece	350	30	27	29	28	27	27	182
Iceland	38	3	3	4	3	3	3	20
Ireland	125	15	16	18	10	5	28	33
Italy	1,094	28	39	45	45	55	71	812
Malta	1	(*)	(*)	(*)	1	(*)	...	...
Netherlands	488	5	3	2	1	(*)	(*)	477
Norway	171	31	4	2	2	2	4	125
Portugal	139	7	10	10	10	7	8	86
Spain	695	51	59	68	58	84	56	318
Sweden	39	1	2	2	3	3	1	27
Switzerland	7	2	3	1	1	...	...	...
Turkey	357	48	38	31	21	27	22	170
United Kingdom	3,172	99	183	196	201	244	203	2,046
Yugoslavia	709	54	84	101	96	64	57	253
European Atomic Energy Community	69	5	6	4	11	3	7	34
European Coal and Steel Community	81	6	6	5	5	5	5	49
North Atlantic Treaty Organization	9	...	...	(*)	...	...	...	9
Other and unspecified Western Europe	60	14	9	8	4	3	3	20
Total, Other Europe	1,149	193	244	241	121	60	44	247
Czechoslovakia	8	...	...	...	...	...	...	8
Hungary	18	(*)	1	1	(*)	(*)	1	15
Poland	313	33	35	46	33	25	24	118
Romania	100	20	15	17	21	18	9	...
U.S.S.R.	709	140	193	177	67	16	10	106
Total, Africa	1,293	139	197	121	110	97	103	526
Algeria	31	12	4	4	3	3	1	3
Angola	6	1	1	1	1	1	1	(*)
Cameroon	3	1	1	1	(*)	(*)	...	...
Egypt	348	50	105	33	24	28	41	67
Ethiopia	49	4	3	3	3	3	3	31
Ghana	84	6	8	7	11	10	13	31
Guinea	9	4	2	1	1	(*)	(*)	1
Ivory Coast	12	2	3	2	(*)	(*)	(*)	3
Kenya	13	3	2	1	(*)	(*)	(*)	6
Liberia	119	8	14	11	11	11	10	54
Libya	7	...	...	...	...	...	...	7
Morocco	198	22	22	28	33	25	19	48

See footnotes at end of table.

TABLE B–5B.—*Summary of U.S. Government foreign credit repayments, July 1, 1945, to Dec. 31, 1976, by area and country*[1]—Continued

[In millions of dollars and equivalents]

Area and country	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
Nigeria	13	2	3	1	(*)	1	(*)	5
Senegal	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Sierra Leone	4	(*)	(*)	(*)	(*)	(*)	(*)	3
Somalia	1	...	...	...	(*)	...	...	1
South Africa	154	(*)	...	...	...	...	...	154
Sudan	27	5	7	8	3	(*)	1	3
Tanzania	4	1	1	(*)	(*)	(*)	(*)	2
Tunisia	83	10	11	11	11	9	7	24
Zaire	31	4	6	6	4	3	3	5
Zambia	21	1	1	1	1	1	1	14
East African Common Services Organization	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Other and unspecified Africa	74	2	4	1	1	1	1	64
Total, Western Hemisphere	6,610	558	547	664	363	300	356	3,822
Antigua	1	...	(*)	...	...	(*)	(*)	(*)
Argentina	747	39	47	39	41	43	39	498
Bahamas	27	2	2	2	2	3	11	5
Bermuda	18	8	5	3	2	...	...	...
Bolivia	59	11	7	7	5	4	4	22
Brazil	1,771	113	121	103	110	89	100	1,135
Cayman Islands	3	1	2	...	...	...	...	...
Chile	992	127	134	292	6	4	49	380
Colombia	456	36	22	23	21	16	18	320
Costa Rica	55	3	3	4	4	4	4	33
Cuba	3	...	...	...	...	...	...	3
Dominican Republic	83	15	11	13	9	7	6	23
Ecuador	109	8	8	8	8	9	7	62
El Salvador	29	3	3	3	3	2	1	14
Guatemala	47	5	5	5	6	4	3	20
Guyana	1	(*)	(*)	(*)	(*)	(*)	(*)	...
Haiti	17	2	1	2	1	1	1	9
Honduras	23	3	4	2	2	1	1	10
Jamaica	39	3	3	2	3	2	2	24
Mexico	970	53	54	47	56	46	49	665
Nicaragua	41	4	3	3	3	3	2	23
Panama	73	14	8	6	7	5	7	27
Paraguay	35	3	3	2	2	2	2	20
Peru	482	45	53	51	35	20	12	267
Surinam	3	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Trinidad and Tobago	23	5	2	1	1	1	2	10
Uruguay	40	4	4	4	3	2	2	21
Venezuela	394	50	42	41	33	29	32	167
Central American Bank for Economic Integration	6	1	1	1	1	1	1	1
Other and unspecified Western Hemisphere	62	(*)	...	...	...	(*)	(*)	62
Total, Asia	12,372	1,080	792	3,094	1,232	927	924	4,322
Afghanistan	48	3	4	4	3	4	3	29
Bangladesh	90	90	(*)	...	...	...	...	...

See footnotes at end of table.

TABLE B–5B.—*Summary of U.S. Government foreign credit repayments, July 1, 1945, to Dec. 31, 1976, by area and country* [1]—Continued

[In millions of dollars and equivalents]

Area and country	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
Brunei	20	20						
Burma	16	2	2	1	1	1	1	8
Cambodia	79		(*)	53	24	1		
China (Taiwan)	510	64	43	43	43	38	42	237
Hong Kong	3	1	1	(*)				(*)
India	3,373	97	111	2,188	117	100	95	666
Indonesia	431	20	13	10	12	9	189	178
Iran	1,039	110	124	132	117	104	92	361
Iraq	20	2	2	2	2	2	2	9
Israel	1,013	157	85	87	98	132	76	377
Japan and Ryukyu Islands	3,085	140	164	144	444	280	286	1,627
Jordan	54	14	14	6	5	(*)	2	13
Korea	540	144	87	81	63	73	48	44
Kuwait	50		5	10	10	10		15
Lebanon	32	4	3	4	3	4	5	10
Malaysia	79	7	9	9	12	8	8	27
Nepal	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Pakistan	500	127	56	37	32	38	22	189
Philippines	506	43	41	3b	67	55	29	236
Saudi Arabia	276	12	11	21	19	27	19	167
Singapore	3	2	1	(*)	(*)	(*)	(*)	
Sri Lanka	36	10	9	10	3	1	(*)	3
Syria	7	4	(*)	(*)	(*)	(*)	(*)	2
Thailand	84	7	6	7	7	6	6	44
Vietnam	459		(*)	209	150	33	2	64
Other and unspecified Asia	16	(*)						16
Total, Oceania	945	79	77	91	164	60	93	380
Australia	828	59	68	81	155	53	85	326
New Zealand	105	8	9	10	9	8	8	53
Papua New Guinea	12	12						
Trust Territory of the Pacific Islands	1							1
Other and unspecified Oceania	(*)							(*)
Canada	257	16	19	13	8	4	1	196
Other international organizations:								
United Nations	94	5	6	5	5	5	5	62

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*Less than $500,000.

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note. Repayments include collections for sale of all or fractional parts of notes and other evidences of indebtedness to foreign participants either in the country of borrower or a 3d country. Such collections are recorded in this *Report* against the country of the borrower.

Source: Compiled by Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

TABLE B–6.—*Summary of U.S. Government foreign assistance through net accumulation of foreign currency claims, July 1, 1945, to Dec. 31, 1976, by area and country*[1]

[In millions of dollars and equivalents]

Area and country	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970[2]
		1976	1975	1974	1973	1972	1971	
Total, all areas	2,000	–53	30	–247	–49	–213	–246	2,779
Total, Europe	603	–20	–23	–22	–19	–31	–25	743
Total, Western Europe	318	2	5	(*)	–2	–3	–1	317
Belgium and Luxembourg	(*)	....	....	....	....	....	–1	1
Finland	8	(*)	(*)	(*)	(*)	(*)	(*)	7
France	2	....	....	....	....	....	(*)	2
Germany	–2	(*)	(*)	(*)	(*)	(*)	(*)	–1
Spain	84	(*)	(*)	(*)	(*)	–1	(*)	84
Switzerland	(*)	....	(*)	(*)	–1	(*)	1	(*)
Turkey	61	–2	(*)	1	(*)	–1	(*)	63
United Kingdom	(*)	....	(*)	(*)	(*)	(*)	(*)	1
Yugoslavia	164	4	5	(*)	–2	–1	–1	160
Other Western Europe	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Other Europe: Poland	286	–22	–28	–21	–17	–28	–24	426
Total, Africa	383	–34	50	–9	–11	–2	–3	391
Egypt	322	–34	47	–7	–4	1	5	313
Ghana	3	(*)	(*)	(*)	(*)	–2	–5	12
Guinea	5	2	–1	–2	–4	–4	–5	21
Morocco	5	2	1	–1	–4	1	2	5
Senegal	(*)	(*)	(*)	(*)	(*)	(*)	(*)	1
Sudan	4	–1	–1	(*)	–1	(*)	(*)	6
Tunisia	20	–2	4	3	2	3	(*)	11
Zaire	23	(*)	(*)	(*)	(*)	(*)	(*)	23
Other Africa	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Total, Western Hemisphere	262	1	(*)	–1	–4	(*)	–1	267
Argentina	6	(*)	(*)	(*)	(*)	(*)	(*)	6
Bolivia	1	(*)	(*)	(*)	(*)	(*)	–1	3
Brazil	194	(*)	(*)	–1	(*)	(*)	(*)	195
Chile	23	1	(*)	(*)	(*)	(*)	(*)	23
Colombia	16	(*)	(*)	(*)	(*)	(*)	(*)	16
Ecuador	1	(*)	(*)	(*)	(*)	(*)	(*)	1
Paraguay	(*)	(*)	(*)	(*)	–3	(*)	(*)	3
Peru	2	(*)	(*)	(*)	(*)	(*)	(*)	2
Uruguay	18	....	(*)	(*)	(*)	....	(*)	18
Other Western Hemisphere	(*)	....	(*)	(*)	(*)	(*)	(*)	(*)
Total, Asia	752	(*)	3	–216	–16	–180	–218	1,378
Afghanistan	4	(*)	(*)	(*)	(*)	(*)	(*)	3
Burma	8	–1	1	1	(*)	(*)	(*)	7
Cambodia	3	....	(*)	–1	–1	1	4	(*)
China (Taiwan)	2	(*)	(*)	(*)	–2	–4	1	7
Hong Kong	1	....	(*)	....	....	....	....	(*)
India	432	–6	–5	–205	–5	–146	–89	889
Indonesia	222	(*)	(*)	(*)	(*)	(*)	(*)	223
Iran	–1	(*)	(*)	(*)	(*)	(*)	–1	(*)
Israel	36	(*)	(*)	(*)	(*)	–1	–8	44
Japan	(*)	(*)	(*)	....	(*)	–2	1	1
Jordan	(*)	(*)	(*)	(*)	(*)	(*)	–1	1

See footnotes at end of table.

TABLE B-6.—*Summary of U.S. Government foreign assistance through net accumulation of foreign currency claims, July 1, 1945, to Dec. 31, 1976, by area and country*[1]—Continued

[In millions of dollars and equivalents]

Area and country	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970[2]
		1976	1975	1974	1973	1972	1971	
Korea	18	(*)	(*)	−1	−1	−21	1	40
Nepal	14	9	1	4	(*)	(*)	(*)	(*)
Pakistan	136	−2	7	4	−2	9	−8	128
Philippines	10	(*)	(*)	(*)	(*)	(*)	(*)	10
Sri Lanka	3	(*)	(*)	(*)	(*)	(*)	−1	3
Syria	9	1				−2		10
Vietnam	−143		(*)	−16	−6	−15	−118	11
Other Asia	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Oceania: Australia	(*)							(*)
Canada	(*)						(*)	(*)

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*Less than $500,000 (plus or minus).

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note.

[2] Activity under these programs did not begin until calendar year 1953.

Source: Compiled by Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

TABLE B-7.—*Summary of U.S. Government foreign credits, July 1, 1940, to Dec. 31, 1976, by major program* [1]

[In millions of dollars and equivalents]

[Numbers in brackets indicate table in which data are available by geographical area and country; † indicates that such data are also shown for 6 recent years.]

	Total	By major program						
		Under Export-Import Bank Act [2]	Under Foreign Assistance Act and related programs		Under Agricultural Trade Development and Assistance Act		Lend-lease, surplus property, and settlements for grants and war accounts	Other credits
			Financing of military purchases	Other	Loans of foreign currencies	Long-term dollar credits		
Gross authorizations by U.S. Government agencies	96,846	[3, 4] 39,634	6,514	22,244	6,286	7,467	6,296	8,404
Deduct—								
Authorizations assumed by participants:								
Other U.S. Government agencies [5]	671	62	609					
Other	563	563						
Deduct—								
Reimbursements by participants: [6]								
Other U.S. Government agencies	16	16						
Private entities	547	547						
Foreign governments and official institutions [7]	152	152						
Add—Export-Import Bank credits utilized for refunding indebtedness outstanding on Export-Import Bank loans	731	731						
Equals—Adjusted authorizations	95,628	39,026	5,905	22,244	6,286	7,467	6,296	8,404
Deduct—								
Authorizations canceled, expired, and otherwise terminated without utilization	11,110	7,126	−53	1,601	681	824	607	324
Disbursements by private enterprises at Export-Import Bank risk [8]	495	495						
Credits unutilized as of December 31, 1976 [B-9]	8,553	[4] 4,071	1,165	2,858	1	458		(*)
Equals—Credits utilized	75,471	27,334	4,793	17,785	5,604	6,186	5,689	8,080
During World War II	1,077	[3] 311					349	417
During postwar period [9] [B-5A†, B-10]	[10] 74,393	27,023	4,793	17,785	5,604	6,186	[10] 5,341	7,662
Add—Increased valuation of lend-lease silver credits repaid by cash collections	9						9	

See footnotes at end of table.

TABLE B-7.—*Summary of U.S. Government foreign credits, July 1, 1940, to Dec. 31, 1976, by major program* [1]—Continued

[In millions of dollars and equivalents]

[Numbers in brackets indicate table in which data are available by geographical area and country; †-indicates that such data are also shown for 6 recent years.]

	Total	By major program						
		Under Export-Import Bank Act [2]	Under Foreign Assistance Act and related programs		Under Agricultural Trade Development and Assistance Act		Lend-lease, surplus property, and settlements for grants and war accounts	Other credits
			Financing of military purchases	Other	Loans of foreign currencies	Long-term dollar credits		
Deduct—								
Adjustment to outstanding principal for discount allowance for extraordinary prepayment	32				25		7	
Principal charged off as uncollectable [11]	25	4		14	5			3
Add—Net adjustment to outstanding principal by revaluation of indebtedness repayable in foreign currencies (exchange risk (loss (−))) [11]	−1,439			−34	−1,397		−8	
Deduct—Principal collections	35,162	16,737	1,331	4,301	2,781	1,374	4,262	4,377
During World War II	342	[8] 176					46	120
During postwar period [9] [B-5B†, B-10]	34,820	[7] 16,561	1,331	4,301	2,781	1,374	4,216	4,257
Equals—Principal outstanding indebtedness as of December 31, 1976 [B-8]	38,821	10,594	3,462	13,435	1,396	4,812	1,421	3,700
Memorandum—								
Principal outstanding as of June 30, 1945	735	135					303	297
Interest collected	14,422	5,886	388	3,254	1,365	527	1,140	1,862
During World War II	70	[8] 36						33
During postwar period [9] [B-10, B-11†]	14,353	5,850	388	3,254	1,365	527	1,140	1,829
Total principal and interest collected	49,584	22,623	1,718	7,556	4,146	1,901	5,401	6,239

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*Less than $500,000.

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note.

[2] Includes Export-Import Bank activity during the period from Feb. 12, 1934, through June 30, 1940, as follows: Gross authorized, $436,132,000; terminated, $118,201,000; disbursed by others at Export-Import Bank risk, $66,701,000; utilized, $92,935,000; principal collected, $42,006,000; interest and commissions collected, $5,760,000; outstanding on Government disbursements, as of June 30, 1940, $50,929,000; outstanding at Government risk on others' disbursements as of June 30, 1940, $47,529,000.

[3] Gross authorizations as published by the Export-Import Bank total $39,998,515,000. This amount has been adjusted for credit extended to domestic institutions ($201,172,000), credits purchased from and resold to the Defense Department ($155,237,000), and certain minor modifications

to achieve consistency over longer periods in Export-Import Bank reporting.

[4] Does not include unutilized portions, if any, of Export-Import Bank refunding credits available for additional refunding under commitments.

[5] The participation of any other Government agency in loans of the Export-Import Bank is subtracted as an adjustment entry from gross authorizations and from disbursements of the Bank, but is included against such other agency in this presentation (except that participation of one Government agency in financing loans of the Bank in the amount of $7,000,000 and participations in individual loans sold to the Secretary of Treasury Deposit Accounts related to foreign government defense procurement in the United States in the amount of $312,055,000 are recorded as Bank transactions, only). Conversely, the participation of the Bank in credits extended by the Defense Department is subtracted as an adjustment entry from gross authorizations and from disbursements of that Department under the Foreign Assistance Act programs, but is included against the Bank in this presentation.

[6] "Reimbursements by participants" represent recovery of U.S. Government funds (1) through sale to private U.S. entities of fractions of notes acquired previously for the Export-Import Bank's portfolio, or (2) where the Bank acts as an agent for the participating private, domestic or foreign entity, or a foreign government or official institution, in *current* disbursement of a loan. These reimbursements are subtracted from gross authorizations of the Bank as an adjustment entry, and are also incorporated as negative disbursements of the Bank in this presentation.

[7] Reimbursements through sales to foreign participants, either in the country of the borrower or a 3d country, are not included as reimbursement by participants, but are included as principal collections, in the amount of $914,779,000. The Export-Import Bank has a contingent liability totaling $279,540,000 (not including guaranteed interest thereon) to repurchase note fractions sold to foreign participants and included in principal collections in this *Report*.

[8] U.S. commercial banks and other private U.S. entities participated in certain loans of the Export-Import Bank under agreements which specified that at the option of either party the Bank would reimburse the private participant for the unpaid principal amount of the loan with accrued interest, or which specified that the Bank would reimburse the disbursing participant to the extent of all or part of the principal in default. Disbursements by the participants under these guarantees were charged to the amounts authorized and thus decreased the amount reported for utilized. In event of repurchase by the Bank, the amounts were incorporated—in the period of the repurchase—as positive entries for utilized and in "Disbursements by private enterprises at Export-Import Bank risk" as negative entries. Nothing remained outstanding at Bank risk on the participations after Oct. 31, 1963.

[9] Includes transactions for lend-lease and prior grants converted into credits occurring after Sept. 2, 1945 (V-J Day); postwar period for data for all other categories begins with July 1, 1945.

[10] Includes $3,682,954,000 representing settlements for postwar relief and other grants under agreements providing for the repayment of principal. This amount is not included in statistics on new credits in tables B-1, B-2, and B-5A. See footnote 4 to table B-1.

[11] Table B-10 includes data by geographical area and country for exchange adjustments and principal charged off as uncollectable, added together.

Source: Compiled by the Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

TABLE B–8.—*Outstanding indebtedness of foreign countries on U.S. Government credits, as of Dec. 31, 1976, by area, country, and major program* [1]

[In millions of dollars and equivalents]

Area and country	Total	Under Export-Import Bank Act	Under Foreign Assistance Act and related programs		Under Agricultural Trade Development and Assistance Act		Lend-lease, surplus property, and settlements for grants and war accounts	Other
			Financing of military purchases	Other	Loans of foreign currencies	Long-term dollar credits		
Total, all areas	38,821	10,594	3,462	13,435	1,396	4,812	1,421	3,700
Total, Europe	10,349	3,460	541	1,446	445	209	1,195	3,053
Total, Western Europe	8,925	2,977	541	1,422	445	209	517	2,814
Austria	45	24	(*)		21			
Belgium and Luxembourg	89	77		13				
Cyprus	4				1			3
Denmark	65	54		12				
Finland	63	48			16			
France	272	155	(*)	(*)			116	
Germany	92	90					2	
Greece	519	30	341	56	44	9		40
Iceland	18	7		4	2	4		
Ireland	54	14		40				
Italy	209	209						
Malta	5			5				
Netherlands	196	196						
Norway	321	314		8				
Portugal	200	78		15	2	44		61
Spain	831	649		20	(*)			(*)
Sweden	28	28						
Switzerland	86	86						
Turkey	1,593	138	201	1,004	81	55		114
United Kingdom	3,424	295		172			399	2,558
Yugoslavia	646	380		54	117	96	(*)	
European Atomic Energy Community	39	(*)						39
European Coal and Steel Community	19			19				
Unspecified Western Europe	106	106						
Total, other Europe	1,425	483		24			679	239
Czechoslovakia	5						5	
Poland	321	121		24				176
Romania	104	46						58
U.S.S.R.	995	316					674	5
Total, Africa	3,256	756	109	1,309	416	579	15	72
Algeria	284	279				5		
Angola	5	5						
Benin	9	(*)		9				

See footnotes at end of table.

TABLE B-8.—*Outstanding indebtedness of foreign countries on U.S. Government credits, as of Dec. 31, 1976, by area, country, and major program*[1]—Continued

[In millions of dollars and equivalents]

Area and country	Total	Under Export-Import Bank Act	Under Foreign Assistance Act and related programs: Financing of military purchases	Under Foreign Assistance Act and related programs: Other	Under Agricultural Trade Development and Assistance Act: Loans of foreign currencies	Under Agricultural Trade Development and Assistance Act: Long-term dollar credits	Lend-lease, surplus property, and settlements for grants and war accounts	Other
Botswana	20			20				
Cameroon	38	13		25				
Central African Empire	3	3						
Egypt	736	25		149	252	291		20
Ethiopia	133	6	13	108	(*)	6		
Gabon	15	15	(*)					
Ghana	192	19		124	19	30		
Guinea	78	10		7	20	40		
Ivory Coast	48	38		7	1	2		
Kenya	47	10	5	27		4		
Liberia	112	24	3	67		3	15	
Madagascar	6			6				
Malawi	20			20				
Mali	3			3	(*)			
Mauritania	4	4						
Morocco	540	31	64	281	44	78		42
Mozambique	1	1						
Niger	3			3				
Nigeria	101	22		79				
Senegal	5	4			1			
Sierra Leone	12	10				1		
Somalia	16			16		1		
Sudan	36	15		12	5	5		
Swaziland	3			3				
Tanzania	69			58		11		
Togo	2	2						
Tunisia	323	11	8	170	70	64		
Uganda	11			11				
Zaire	306	159	16	83	3	35		10
Zambia	37	31		5		2		
East African Common Services Organization	2					2		
Other Africa	(*)							(*)
Unspecified Africa	36	18		19				
Total, Western Hemisphere	7,655	2,485	257	4,356	63	391	8	95
Antigua	1	1						
Argentina	354	214	42	98	(*)			(*)
Bahamas	28	28						
Barbados	1	1						
Bermuda	10	10						
Bolivia	268	32	6	178	12	31		9
Brazil	2,305	878	119	1,205	11	91	1	(*)

See footnotes at end of table.

TABLE B–8.—*Outstanding indebtedness of foreign countries on U.S. Government credits, as of Dec. 31, 1976, by area, country, and major program* [1]—Continued

[In millions of dollars and equivalents]

Area and country	Total	Under Export-Import Bank Act	Under Foreign Assistance Act and related programs: Financing of military purchases	Under Foreign Assistance Act and related programs: Other	Under Agricultural Trade Development and Assistance Act: Loans of foreign currencies	Under Agricultural Trade Development and Assistance Act: Long-term dollar credits	Lend-lease, surplus property, and settlements for grants and war accounts	Other
Cayman Islands	11	11						
Chile	1,060	261	23	606	20	134		17
Colombia	896	52	11	794	4	35		(*)
Costa Rica	95	13		82				(*)
Cuba	36	36						
Dominican Republic	281	50	(*)	171		41		18
Ecuador	125	17	(*)	95	(*)	12		(*)
El Salvador	73	2	1	69				
Guatemala	108	21	5	81	(*)			(*)
Guyana	59	6		53		1		
Haiti	38	21		9		7	(*)	(*)
Honduras	82	7	2	66		7		(*)
Jamaica	96	63		31		2		
Mexico	578	490		83	5			(*)
Netherlands Antilles	3	3						
Nicaragua	131	6	3	121				(*)
Panama	195	76		119				
Paraguay	62	5		44	5	7		
Peru	292	71	24	141	(*)			50
Surinam	4	3		1				
Trinidad and Tobago	17	17						
Uruguay	89	2	12	52	(*)	23		(*)
Venezuela	172	88	8	76				(*)
Central American Bank for Economic Integration	141			141				
Central American Monetary Stabilization Fund	10			10				
Caribbean Development Bank	14			14				
Andean Development Corporation	4			4				
Other Western Hemisphere	(*)			(*)				
Unspecified Western Hemisphere	19			12			7	
Total, Asia	16,853	3,232	2,555	6,325	472	3,634	203	432
Afghanistan	101			78	2	21		
Bangladesh	548	2		152	1	394		
Burma	45	(*)		29	15			
Cambodia	207					207		
China (Taiwan)	977	515	167	127	26	18	116	8
Hong Kong	41	41						

See footnotes at end of table.

TABLE B–8.—*Outstanding indebtedness of foreign countries on U.S. Government credits, as of Dec. 31, 1976, by area, country, and major program*[1]—Continued

[In millions of dollars and equivalents]

Area and country	Total	Under Export-Import Bank Act	Under Foreign Assistance Act and related programs		Under Agricultural Trade Development and Assistance Act		Lend-lease, surplus property, and settlements for grants and war accounts	Other
			Financing of military purchases	Other	Loans of foreign currencies	Long-term dollar credits		
India	3,612	112	3	2,816	63	607		12
Indonesia	1,643	341	6	447		758	34	57
Iran	836	684	23	43	26	36	23	
Iraq	6	2				4		
Israel	2,776	150	2,073	240	72	241		
Japan	673	652				4	10	8
Jordan	109	12	37	23	3	33		
Korea	1,731	252	197	441	1	571	20	249
Lebanon	67	57				10		
Malaysia	71	44	21	6				
Nepal	2			(*)	2			
Pakistan	2,501	66	1	1,685	231	467		52
Philippines	429	170	27	110	5	69	(*)	48
Saudi Arabia	9	9						
Singapore	90	90						
Sri Lanka	146	3		25	10	108		
Syria	50			1	14	36		
Thailand	84	28	(*)	42	2	12		
Vietnam	97			59		38		
Other Asia	(*)			(*)				
Unspecified Asia	2			2				
Total, Oceania	376	376						
Australia	248	248						
New Zealand	110	110						
Papua New Guinea	18	18						
Canada	285	285						
Other international organizations:								
United Nations	47							47

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*Less than $500,000.

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note. Includes only indebtedness arising from credits extended since 1934. Includes estimates for the U.S. dollar equivalent of indebtedness denominated in other than dollars. See table B–8A for indebtedness repayable in U.S. dollars (totaling $36,002,179,000) and table B–8B for indebtedness repayable at the option of the debtor in foreign currencies, goods, or services (totaling $2,818,486,000).

Source: Compiled by Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

TABLE B–8A.—*Outstanding indebtedness of foreign countries on U.S. Government credits, repayable in U.S. dollars, as of Dec. 31, 1976, by area, country, and major program*[1]

[In millions of dollars and equivalents]

Area and country	Total	Under Export-Import Bank Act	Under Foreign Assistance Act and related programs		Under Agricultural Trade Development and Assistance Act		Lend-lease, surplus property, and settlements for grants and war accounts	Other
			Financing of military purchases	Other	Loans of foreign currencies	Long-term dollar credits		
Total, all areas	36,002	10,594	3,462	12,062	28	4,812	1,346	3,699
Total, Europe	9,669	3,460	541	1,198	12	209	1,195	3,053
Total, Western Europe	8,244	2,977	541	1,174	12	209	517	2,814
Austria	24	24	(*)					
Belgium and Luxembourg	89	77		13				
Cyprus	3							3
Denmark	65	54		12				
Finland	60	48			12			
France	272	155	(*)				116	
Germany	92	90					2	
Greece	432	30	341	12		9		40
Iceland	14	7		4		4		
Ireland	54	14		40				
Italy	209	209						
Malta	5			5				
Netherlands	196	196						
Norway	321	314		8				
Portugal	198	78		15		44		61
Spain	651	649		1		(*)		(*)
Sweden	28	28						
Switzerland	86	86						
Turkey	1,376	138	201	869		55		114
United Kingdom	3,423	295		172			399	2,558
Yugoslavia	481	380		6		96		
European Atomic Energy Community	39	(*)						39
European Coal and Steel Community	19			19				
Unspecified Western Europe	106	106						
Total, other Europe	1,425	483		24			679	239
Czechoslovakia	5						5	
Poland	321	121		24				176
Romania	104	46						58
U.S.S.R.	995	316					674	5
Total, Africa	2,637	756	109	1,107		579	15	72
Algeria	284	279				5		
Angola	5	5						
Benin	9	(*)		9				
Botswana	20			20				

See footnotes at end of table.

TABLE B-8A.—*Outstanding indebtedness of foreign countries on U.S. Government credits, repayable in U.S. dollars, as of Dec. 31, 1976, by area, country, and major program* [1]—Continued

[In millions of dollars and equivalents]

Area and country	Total	Under Export-Import Bank Act	Under Foreign Assistance Act and related programs		Under Agricultural Trade Development and Assistance Act		Lend-lease, surplus property, and settlements for grants and war accounts	Other
			Financing of military purchases	Other	Loans of foreign currencies	Long-term dollar credits		
Cameroon	38	13		25				
Central African Empire	3	3						
Egypt	478	25		142		291		20
Ethiopia	124	6	13	99		6		
Gabon	15	15	(*)					
Ghana	173	19		124		30		
Guinea	58	10		7		40		
Ivory Coast	47	38		7		2		
Kenya	47	10	5	27		4		
Liberia	112	24	3	67		3	15	
Madagascar	6			6				
Malawi	20			20				
Mali	3			3				
Mauritania	4	4						
Morocco	328	31	64	112		78		42
Mozambique	1	1						
Niger	3			3				
Nigeria	101	22		79				
Senegal	4	4						
Sierra Leone	12	10				1		
Somalia	15			14		1		
Sudan	31	15		12		5		
Swaziland	3			3				
Tanzania	69			58		11		
Togo	2	2						
Tunisia	236	11	8	154		64		
Uganda	11			11				
Zaire	302	159	16	83		35		10
Zambia	37	31		5		2		
East African Common Services Organization	2					2		
Other Africa	(*)							(*)
Unspecified Africa	35	18		18				
Total, Western Hemisphere	7,068	2,485	257	3,825	9	391	8	94
Antigua	1	1						
Argentina	311	214	42	55				
Bahamas	28	28						
Barbados	1	1						
Bermuda	10	10						
Bolivia	244	32	6	165		31		8
Brazil	2,209	878	119	1,121		91	1	
Cayman Islands	11	11						

See footnotes at end of table.

TABLE B–8A.—*Outstanding indebtedness of foreign countries on U.S. Government credits, repayable in U.S. dollars, as of Dec. 31, 1976, by area, country, and major program* [1]—Continued

[In millions of dollars and equivalents]

Area and country	Total	Under Export-Import Bank Act	Under Foreign Assistance Act and related programs		Under Agricultural Trade Development and Assistance Act		Lend-lease, surplus property, and settlements for grants and war accounts	Other
			Financing of military purchases	Other	Loans of foreign currencies	Long-term dollar credits		
Chile	1,001	261	23	563	4	134		17
Colombia	842	52	11	744		35		
Costa Rica	77	13		64				
Cuba	36	36						
Dominican Republic	268	50	(*)	158		41		18
Ecuador	98	17	(*)	69		12		
El Salvador	50	2	1	46				
Guatemala	93	21	5	66		(*)		
Guyana	59	6		53		1		
Haiti	32	21		3		7	(*)	(*)
Honduras	69	7	2	53		7		
Jamaica	96	63		31		2		
Mexico	548	490		53	5			
Netherlands Antilles	3	3						
Nicaragua	110	6	3	100				(*)
Panama	177	76		101				
Paraguay	49	5		37		7		
Peru	229	71	24	84		(*)		50
Surinam	4	3		1				
Trinidad and Tobago	17	17						
Uruguay	80	2	12	43		23		
Venezuela	129	88	8	33				
Central American Bank for Economic Integration	141			141				
Central American Monetary Stabilization Fund	10			10				
Caribbean Development Bank	14			14				
Andean Development Corporation	4			4				
Other Western Hemisphere	(*)			(*)				
Unspecified Western Hemisphere	18			11			7	
Total, Asia	15,920	3,232	2,555	5,932	7	3,634	128	432
Afghanistan	99			78		21		
Bangladesh	547	2		152		394		
Burma	4	(*)			3			
Cambodia	207					207		
China (Taiwan)	815	515	167	36		18	71	8
Hong Kong	41	41						
India	3,548	112	3	2,814		607		12

See footnotes at end of table.

TABLE B–8A.—*Outstanding indebtedness of foreign countries on U.S. Government credits, repayable in U.S. dollars, as of Dec. 31, 1976, by area, country, and major program*[1]—Continued

[In millions of dollars and equivalents]

Area and country	Total	Under Export-Import Bank Act	Under Foreign Assistance Act and related programs		Under Agricultural Trade Development and Assistance Act		Lend-lease, surplus property, and settlements for grants and war accounts	Other
			Financing of military purchases	Other	Loans of foreign currencies	Long-term dollar credits		
Indonesia	1,643	341	6	447		758	34	57
Iran	812	684	23	43	2	36	23	
Iraq	6	2				4		
Israel	2,669	150	2,073	204	1	241		
Japan	663	652				4		8
Jordan	105	12	37	23		33		
Korea	1,709	252	197	440		571		249
Lebanon	67	57				10		
Malaysia	71	44	21	6				
Pakistan	2,108	66	1	1,523		467		52
Philippines	400	170	27	86		69		48
Saudi Arabia	9	9						
Singapore	90	90						
Sri Lanka	133	3		23		108		
Syria	37			1		36		
Thailand	56	28	(*)	15		12		
Vietnam	79			41		38		
Other Asia	(*)			(*)				
Unspecified Asia	2			2				
Total, Oceania	376	376						
Australia	248	248						
New Zealand	110	110						
Papua New Guinea	18	18						
Canada	285	285						
Other international organizations:								
United Nations	47							47

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*Less than $500,000.

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note. Includes outstanding indebtedness repayable in U.S. dollars. (The U.S. Government may exercise its option to request foreign currencies, goods, or services on many of these credits.) Includes $1,328,000 denominated in foreign currencies (without maintenance of dollar value) and repayable in U.S. dollars.

Source: Compiled by Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

TABLE B-8B.—*Outstanding indebtedness of foreign countries on U.S. Government credits, repayable in foreign currencies, as of Dec. 31, 1976, by area, country, and major program*[1]

[In millions of dollars and equivalents]

Area and country	Total	Under Foreign Assistance Act and related programs: Other than financing of military purchases	Under Agricultural Trade Development and Assistance Act: Loans of foreign currencies		Lend-lease, surplus property, and settlements for grants and war accounts	Other credits
			To foreign governments	To private enterprises		
Total, all areas	2,818	1,374	1,276	92	75	1
Total, Europe	681	248	421	12	(*)	(*)
Total, Western Europe	681	248	421	12	(*)	(*)
Austria	21		21			
Cyprus	1		1			
Finland	4		4			
Greece	88	44	43	(*)		(*)
Iceland	3	1	2			
Portugal	2		2			
Spain	180	18	162			
Turkey	217	136	70	11		
Yugoslavia	165	48	117		(*)	
Other Western Europe	1	1				
Total, Africa	618	202	411	5		
Egypt	258	6	252			
Ethiopia	9	8	(*)			
Ghana	19		16	2		
Guinea	20		20			
Ivory Coast	1		1			
Morocco	212	168	43	1		
Senegal	1		1			
Somalia	1	1				
Sudan	5		5			
Tunisia	87	17	69	1		
Zaire	3		3	(*)		
Other Africa	(*)		(*)			
Unspecified Africa	1	1				
Total, Western Hemisphere	587	532	53	2		1
Argentina	43	43	(*)			(*)
Bolivia	25	13	11	1		(*)
Brazil	96	84	11			(*)
Chile	59	43	16			(*)
Colombia	54	50	4	(*)		(*)
Costa Rica	18	18				(*)
Dominican Republic	13	13				
Ecuador	26	26	(*)			(*)
El Salvador	23	23				
Guatemala	15	15				(*)
Haiti	6	6				
Honduras	13	13				(*)
Mexico	29	29				(*)
Nicaragua	21	21				

See footnotes at end of table.

TABLE B-8B.—*Outstanding indebtedness of foreign countries on U.S. Government credits, repayable in foreign currencies, as of Dec. 31, 1976, by area, country, and major program*[1]—Continued

[In millions of dollars and equivalents]

Area and country	Total	Under Foreign Assistance Act and related programs: Other than financing of military purchases	Under Agricultural Trade Development and Assistance Act: Loans of foreign currencies: To foreign governments	Under Agricultural Trade Development and Assistance Act: Loans of foreign currencies: To private enterprises	Lend-lease, surplus property, and settlements for grants and war accounts	Other credits
Panama	18	18				
Paraguay	12	7	4	1		
Peru	63	57	6	(*)		(*)
Uruguay	9	9	(*)			(*)
Venezuela	43	43				(*)
Unspecified Western Hemisphere	(*)	(*)				
Total, Asia	933	392	392	74	75	
Afghanistan	2		2			
Bangladesh	1			1		
Burma	41	29	12			
China (Taiwan)	162	91	26	(*)	45	
India	64	1		63		
Iran	24		24			
Israel	106	36	70	(*)		
Japan	10				10	
Jordan	3		3			
Korea	23	1		1	20	
Nepal	2	(*)	2			
Pakistan	393	162	223	8		
Philippines	30	24	5	(*)	(*)	
Sri Lanka	12	3	9	(*)		
Syria	14		14			
Thailand	28	27	2			
Vietnam	18	18				

*Less than $500,000.

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note. Includes the estimated U.S. dollar equivalent of the outstanding indebtedness repayable at the option of the debtor in foreign currencies, goods, or services.

Part of this outstanding indebtedness is denominated in U.S. dollars, but repayable in foreign currencies with maintenance of U.S. dollar value; the remainder is denominated in foreign currencies and repayable without maintenance of U.S. dollar value, as follows (in millions of dollars and equivalents):

	Repayable in foreign currencies: With maintenance of U.S. dollar value	Repayable in foreign currencies: Without maintenance of U.S. dollar value
Total	1,766	1,052
Under Foreign Assistance Act and related programs	1,328	46
Under Agricultural Trade Development and Assistance Act:		
To foreign governments	372	905
To private enterprises		92
Lend-lease, surplus property, and settlements for grants and war accounts	65	10
Other	1	

Additional details are available in the semiannual report, "Foreign Credits by the United States Government."

Source: Compiled by the Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

TABLE B-9.—*Unutilized balances of U.S. Government foreign credits as of Dec. 31, 1976, by area, country, and major program* [1]

[In millions of dollars and equivalents]

Area and country	Total [2]	Under Export-Import Bank Act	Under Foreign Assistance Act and related programs		Under Agricultural Trade Development and Assistance Act		Other credits
			Financing of military purchases	Other	Loans of foreign currencies	Long-term dollar credits	
Total, all areas	8,553	4,071	1,165	2,858	1	458	(*)
Total, Europe	1,465	1,237	70	111		48	
Total, Western Europe	1,187	959	70	111		48	
Denmark	8	8					
Finland	18	18					
France	23	23	(*)				
Greece	72	2	6	65			
Italy	40	40					
Netherlands	1	1					
Norway	28	28					
Portugal	90	4		38		48	
Spain	453	453					
Sweden	11	11					
Switzerland	9	9					
Turkey	178	108	64	7			
United Kingdom	88	88					
Yugoslavia	155	154		1			
Other Western Europe	1	1					
Unspecified Western Europe	12	12					
Total, other Europe	278	278					
Poland	102	102					
Romania	25	25					
U.S.S.R.	151	151					
Total, Africa	1,546	393	115	871	1	165	
Algeria	203	203					
Benin	14			14			
Botswana	4			4			
Cameroon	4	4					
Egypt	855	18		682		155	
Ethiopia	29		23	6		(*)	
Gabon	12	5	2	5			
Ghana	24	4		21			
Guinea	3				1	2	
Ivory Coast	26	26					
Kenya	49	3	30	16			
Liberia	17	(*)	2	15			
Malawi	11			11			
Mali	4		(*)	3			
Mauritania	1	1					
Morocco	60	27	12	20		1	
Nigeria	1			1			
Rwanda	1			1			
Senegal	5	5			(*)		
Sierra Leone	9	9					
Sudan	5			5			

See footnotes at end of table.

TABLE B-9.—*Unutilized balances of U.S. Government foreign credits as of Dec. 31, 1976, by area, country, and major program*[1]—Continued

[In millions of dollars and equivalents]

Area and country	Total[2]	Under Export-Import Bank Act	Under Foreign Assistance Act and related programs: Financing of military purchases	Under Foreign Assistance Act and related programs: Other	Under Agricultural Trade Development and Assistance Act: Loans of foreign currencies	Under Agricultural Trade Development and Assistance Act: Long-term dollar credits	Other credits
Tanzania	7			7		(*)	
Tunisia	40	14	26			(*)	
Upper Volta	1	1					
Zaire	84	46	21	16		(*)	
Zambia	52	27		20		5	
Other Africa	1	(*)		1			
Unspecified Africa	25	(*)		25			
Total, Western Hemisphere	1,770	866	175	698		30	(*)
Argentina	97	47	50				(*)
Barbados	1	1					
Bolivia	83	(*)	9	73			
Brazil	392	325	23	45			
Cayman Islands	2	2					
Chile	62	1	11	35		16	
Colombia	73	10	21	42			
Costa Rica	15	1		14			
Dominican Republic	60	30	1	24		5	
Ecuador	16	3	10	3			
El Salvador	28	5	1	22			
Guatemala	54	(*)	1	54			
Guyana	12	1		11			
Haiti	27			19		7	
Honduras	55	4	3	47		(*)	
Jamaica	19	7		10		2	
Mexico	304	304					
Nicaragua	78	14	2	61			
Panama	62	14	1	47			
Paraguay	9		1	8			
Peru	109	49	20	40			(*)
Trinidad and Tobago	5	5					
Uruguay	16	(*)	5	11			
Venezuela	58	42	16				
Central American Bank for Economic Integration	50			50			
Caribbean Development Bank	29			29			
Andean Development Corporation	11			11			
Other Western Hemisphere	(*)	(*)					
Unspecified Western Hemisphere	44			44			
Total, Asia	3,721	1,524	804	1,178		215	
Afghanistan	5			5		(*)	
Bangladesh	110			67		43	
China (Taiwan)	534	491	42				
Hong Kong	6	6					
India	15	1	9	(*)		5	
Indonesia	349	115	23	178		32	

See footnotes at end of table.

TABLE B-9.—*Unutilized balances of U.S. Government foreign credits as of Dec. 31, 1976, by area, country, and major program*[1]—Continued

[In millions of dollars and equivalents]

Area and country	Total[2]	Under Export-Import Bank Act	Under Foreign Assistance Act and related programs: Financing of military purchases	Under Foreign Assistance Act and related programs: Other	Under Agricultural Trade Development and Assistance Act: Loans of foreign currencies	Under Agricultural Trade Development and Assistance Act: Long-term dollar credits	Other credits
Iran	43	42	1				
Israel	839	96	377	365		2	
Japan	123	123					
Jordan	161		106	49		6	
Korea	492	273	157	24		38	
Lebanon	10	2	8				
Malaysia	36	14	22				
Pakistan	244	14		191		39	
Philippines	376	259	10	106		(*)	
Saudi Arabia	4		4				
Singapore	50	50					
Sri Lanka	52			11		41	
Syria	171			171		(*)	
Thailand	93	38	44	10			
Vietnam	9					9	
Yemen (Aden)	1			1			
Total, Oceania	29	28	1				
Australia	16	15	1				
New Zealand	13	13					
Canada	22	22					

*Less than $500,000.

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note.

[2] Excludes uncommitted lending authorities.

Source: Compiled by Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

TABLE B-10.—*Summary of U.S. Government foreign credits, July 1, 1945, to Dec. 31, 1976, and principal and interest due and unpaid for 90 days or more, as of Dec. 31, 1976, by program, and by area and country* [1]
[In millions of dollars and equivalents]

Major program, and area and country	July 1, 1945, to Dec. 31, 1976				Due and unpaid 90 days or more [2]	
	Utilized [3]	Repaid	Exchange adjustments (+ or −) and principal charged off as uncollectable (−) [4]	Interest and commissions collected	Principal	Interest [5]
Total, all programs and all areas	74,393	34,820	−1,465	14,353	152	110
BY CREDIT PROGRAM						
Under Export-Import Bank Act	27,023	16,561	−4	5,850	45	44
Under Foreign Assistance Act and related programs:						
Country program loans	16,762	3,903	−37	3,074	10	5
Social Progress Trust Fund	747	239		129		
Financing of military purchases	4,793	1,331		388	6	1
Deficiency and basic materials development	147	133	−11	35	1	(*)
Investment incentive credits	129	26		16	(*)	(*)
Under Agricultural Trade Development and Assistance Act:						
Currency loans to:						
Foreign governments	5,181	2,547	−1,306	1,224	(*)	(*)
Private enterprises	423	234	−96	141	6	4
Long-term dollar credits	6,186	1,374		527	2	6
Lend-lease, surplus property, and settlements for grants and war accounts	5,341	4,216	−8	1,140	79	49
Other credits	7,662	4,257	−3	1,829	2	(*)
BY AREA AND COUNTRY						
Total, Europe	23,531	13,250	−311	5,895	5	4
Total, Western Europe	20,960	12,101	−311	5,582	(*)	1
Austria	167	122		39		
Belgium and Luxembourg	351	262		94		
Cyprus	8	4	(*)	1		
Denmark	114	49		33		
Finland	208	168	−1	87		
France	2,733	2,458	−3	840		(*)
Germany	1,524	1,432	(*)	284		(*)
Greece	874	350	−5	173		
Iceland	61	38	−5	18		
Ireland	180	125		77		
Italy	1,304	1,094	(*)	237		
Liechtenstein	2	2		(*)		
Malta	6	1		(*)		
Netherlands	647	488		141		
Norway	492	171	(*)	79		
Portugal	340	139	−1	77		
Spain	1,533	695	−6	406	(*)	1
Sweden	67	39		11		
Switzerland	93	7		14		
Turkey	2,031	357	−81	409	(*)	(*)

See footnotes at end of table.

TABLE B-10.—*Summary of U.S. Government foreign credits, July 1, 1945, to Dec. 31, 1976, and principal and interest due and unpaid for 90 days or more, as of Dec. 31, 1976, by program, and by area and country* [1]—Continued

[In millions of dollars and equivalents]

Major program, and area and country	July 1, 1945, to Dec. 31, 1976				Due and unpaid 90 days or more [2]	
	Utilized [3]	Repaid	Exchange adjustments (+ or −) and principal charged off as uncollectable (−) [4]	Interest and commissions collected	Principal	Interest [5]
United Kingdom	6,280	3,172	−1	2,084		(*)
Yugoslavia	1,564	709	−209	356		(*)
European Atomic Energy Community	108	69		34		
European Coal and Steel Community	100	81		57		
North Atlantic Treaty Organization	9	9				
Unspecified Western Europe	164	58		32		
Total, other Europe	2,571	1,149	(*)	313	5	3
Czechoslovakia	13	8		1	5	3
Hungary	18	18		6		
Poland	631	313	(*)	106	(*)	(*)
Romania	204	100		21		(*)
U.S.S.R.	1,704	709		178		
Total, Africa	4,658	1,293	−117	832	22	12
Algeria	315	31	(*)	42		(*)
Angola	11	6	(*)	3		(*)
Benin	10	(*)		(*)		
Botswana	20			1		
Cameroon	41	3		6		
Central African Empire	3			(*)		(*)
Egypt	1,187	348	−103	188	2	(*)
Ethiopia	178	49	(*)	26	(*)	
Gabon	15			1		(*)
Ghana	278	84	−3	74	(*)	(*)
Guinea	87	9	(*)	8	1	1
Ivory Coast	60	12	(*)	14		
Kenya	59	13	(*)	7		(*)
Liberia	227	119	(*)	61	(*)	
Libya	7	7		1		
Madagascar	6			(*)		
Malawi	20			1		
Mali	3	(*)	(*)	(*)		
Mauritania	4	(*)		(*)		
Morocco	732	198	7	190	(*)	(*)
Mozambique	2	(*)		(*)		
Niger	3	(*)		(*)		
Nigeria	115	13		14	1	(*)
Senegal	6	1	(*)	1		(*)
Sierra Leone	15	4		3		
Somalia	17	1		1	2	1
South Africa	154	154	(*)	40		
Sudan	70	27	−7	11	1	(*)
Swaziland	3			(*)		
Tanzania	73	4	−1	6		

See footnotes at end of table.

TABLE B-10.—*Summary of U.S. Government foreign credits, July 1, 1945, to Dec. 31, 1976, and principal and interest due and unpaid for 90 days or more, as of Dec. 31, 1976, by program, and by area and country* [1]—Continued

[In millions of dollars and equivalents]

Major program, and area and country	July 1, 1945, to Dec. 31, 1976				Due and unpaid 90 days or more [2]	
	Utilized [3]	Repaid	Exchange adjustments (+ or −) and principal charged off as uncollectable (−)[4]	Interest and commissions collected	Principal	Interest [5]
Togo	2	(*)	....	(*)	(*)	....
Tunisia	394	83	12	68	(*)	....
Uganda	11	(*)	....	1	(*)	(*)
Zaire	355	31	−19	30	13	9
Zambia	58	21	....	8	....	....
East African Common Services Organization	3	1	....	(*)	(*)	(*)
Other Africa	(*)	(*)	....	(*)	....	....
Unspecified Africa	112	73	−3	23	1	(*)
Total, Western Hemisphere	**14,426**	**6,609**	**−285**	**2,865**	**40**	**36**
Antigua	2	1	....	1	(*)	(*)
Argentina	1,115	747	−15	292	(*)	(*)
Bahamas	55	27	....	11	....	(*)
Barbados	1	(*)	....	(*)	....	....
Bermuda	28	18	....	5	....	....
Bolivia	340	59	−14	52	....	(*)
Brazil	4,243	1,770	−187	922	(*)	(*)
Cayman Islands	14	3	....	2	....	....
Chile	2,070	992	−18	395	....	....
Colombia	1,372	456	−27	210	(*)	(*)
Costa Rica	145	55	(*)	28	....	(*)
Cuba	40	3	....	9	36	34
Dominican Republic	361	83	....	43	1	1
Ecuador	229	109	(*)	48	....	....
El Salvador	101	29	....	15	(*)	....
Guatemala	155	47	....	20	(*)	(*)
Guyana	60	1	(*)	4	....	....
Haiti	47	17	(*)	13	....	....
Honduras	105	23	....	12	(*)	(*)
Jamaica	135	39	(*)	22	....	....
Mexico	1,550	970	−3	362	1	(*)
Netherlands Antilles	3	(*)	....	1	....	....
Nicaragua	169	41	....	19	....	....
Panama	268	73	....	43	....	....
Paraguay	92	35	(*)	22	1	1
Peru	779	482	−5	141	(*)	(*)
Surinam	7	3	....	2	....	....
Trinidad and Tobago	40	23	....	11	....	....
Uruguay	144	40	−14	23	....	....
Venezuela	565	394	(*)	118	(*)	(*)
Central American Bank for Economic Integration	148	6	....	9	....	....
Central American Monetary Stabilization Fund	10	....	....	(*)	....	....
Caribbean Development Bank	14	....	....	(*)	....	....

See footnotes at end of table.

TABLE B-10.—*Summary of U.S. Government foreign credits, July 1, 1945, to Dec. 31, 1976, and principal and interest due and unpaid for 90 days or more, as of Dec. 31, 1976, by program, and by area and country*[1]—Continued

[In millions of dollars and equivalents]

Major program, and area and country	July 1, 1945, to Dec. 31, 1976				Due and unpaid 90 days or more[2]	
	Utilized[3]	Repaid	Exchange adjustments (+ or −) and principal charged off as uncollectable (−)[4]	Interest and commissions collected	Principal	Interest[5]
Andean Development Corporation	4			(*)		
Other Western Hemisphere	(*)	(*)	(*)	(*)		
Unspecified Western Hemisphere	18	62		12		
Total, Asia	29,789	12,372	−750	4,439	84	57
Afghanistan	149	48	−1	36		
Bangladesh	549	90	(*)	14	(*)	(*)
Bahrain		16		1		
Brunei	20	20		6		
Burma	61	16		25		
Cambodia	286	79		1		5
China (Taiwan)	1,437	510	1	227	51	35
Hong Kong	44	3		4		
India	7,357	3,373	−465	1,358	5	2
Indonesia	2,090	431	−15	232	(*)	(*)
Iran	1,873	1,039	2	407	23	12
Iraq	27	20		5	(*)	(*)
Israel	3,854	1,013	−66	540		(*)
Japan and Ryukyu Islands	3,794	3,085	−4	490		
Jordan	162	54	(*)	23	1	
Korea	2,275	540	−4	205		(*)
Kuwait	50	50		13		
Lebanon	99	32		12	1	(*)
Malaysia	151	79		25	(*)	(*)
Nepal	4	1	−1	1		
Pakistan	3,234	500	−185	481	(*)	(*)
Philippines	947	506	−11	166	(*)	
Saudi Arabia	266	276		39		(*)
Singapore	98	3		13		
Sri Lanka	184	36	−2	26		
Syria	57	7	(*)	7	(*)	
Thailand	168	84		54		
Vietnam	556	459	(*)	27	3	2
Other Asia	(*)			(*)		(*)
Unspecified Asia	2	(*)		1		
Total, Oceania	1,314	945	−1	243		
Australia	1,067	828		202		
New Caledonia	2	(*)	−1	(*)		
New Zealand	214	105		32		
Papua New Guinea	31	12		9		
Trust Territory of the Pacific Islands	1	1		(*)		
Canada	535	257		63		
Other international organizations: United Nations	141	94		15		

See footnotes on next page.

*Less than $500,000 (plus or minus).

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note. Excludes transactions on credits originating before 1940, with the exception that transactions on all Export-Import Bank credits (since 1934) are included.

[2] As reported by the operating agencies. Does not include principal or interest for which revised, deferred terms have been agreed upon (for example, interest and principal on the British loan and lend-lease, surplus property, and settlements for grants due from the United Kingdom in 1956, 1957, 1964, 1965, 1968, and 1976, and deferred by agreement of Mar. 6, 1957, and Public Law 85–21, until Dec. 31, 2001, or later). Does not include amounts reported charged off as uncollectable. Excludes $48,474,000 principal and interest due from the Republic of China for assets left on the Asian continent, for which Export-Import Bank by agreement with that Government has deferred from pressing.

[3] Includes $3,682,954,000 representing settlements for postwar relief and other grants under agreements providing for repayment of principal. This amount is not included in statistics on new credits in tables B–1, B–2, and B–5A.

[4] "Exchange adjustments" total $1,439,278,000 and generally occur on loans extended in foreign currency with repayment scheduled in foreign currency when devaluation occurs in the exchange rate after disbursement. Some adjustments result from currency appreciation and increase the value of the indebtedness outstanding. If the credit was denominated in dollars and a rate specified in the credit agreement, although different from the current exchange value, was used for collections no adjustment has been computed. All principal charged off as uncollectable ($25,282,000) has been on loans to nongovernmental foreign entities. Amounts of accrued interest charged off as uncollectable are not included in this table. Adjustments in the value of lend-lease silver returned, in the amount of $8,564,000, are not included in "exchange adjustments." Adjustments to outstanding principal for discount allowed for extraordinary prepayments are not included in "exchange adjustments."

[5] Amounts reported are known to be understated; in several instances agencies have stopped reporting accruals of interest when credits have gone into default.

Source: Compiled by Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

TABLE B-11.—*Summary of interest and commissions collected on U.S. Government foreign credits, July 1, 1945, to Dec. 31, 1976, by program, and by area and country* [1]

[In millions of dollars and equivalents]

Major program, and area and country	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
Total, all programs and all areas	14,353	1,271	1,112	1,055	918	827	829	8,340
BY CREDIT PROGRAM								
Under Export-Import Bank Act	5,850	614	530	452	352	313	321	3,267
Under Foreign Assistance Act and related programs:								
Country program loans	3,074	270	214	199	195	198	191	1,807
Social Progress Trust Fund	129	13	13	13	13	13	12	53
Financing of military purchases	388	143	81	61	42	30	20	11
Deficiency and basic materials development	35	(*)	(*)	(*)	1	(*)	(*)	33
Investment incentive credits	16	7	5	3	1	(*)	(*)	(*)
Under Agricultural Trade Development and Assistance Act:								
Currency loans to:								
Foreign governments	1,224	47	45	67	96	98	107	765
Private enterprises	141	7	8	11	11	10	11	83
Long-term dollar credits	527	92	74	80	76	49	49	107
Lend-lease, surplus property, and settlements for grants and war accounts	1,140	7	17	18	17	20	33	1,028
Other credits	1,829	72	126	150	113	95	86	1,187
BY AREA AND COUNTRY								
Total, Europe	5,895	320	346	321	278	245	248	4,137
Total, Western Europe	5,582	279	304	277	262	237	241	3,984
Austria	39	2	1	2	3	2	2	27
Belgium and Luxembourg	94	5	4	3	2	2	3	75
Cyprus	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Denmark	33	4	3	3	1	(*)	1	21
Finland	87	3	3	2	3	3	2	71
France	840	13	13	13	13	9	7	773
Germany	284	7	6	3	2	2	1	263
Greece	173	24	16	11	8	8	9	97
Iceland	18	1	1	1	1	1	1	13
Ireland	77	2	3	4	4	3	5	55
Italy	237	14	15	15	14	14	15	150
Netherlands	141	12	9	7	4	1	(*)	108
Norway	79	17	12	8	4	2	1	35
Portugal	77	6	5	5	4	4	4	49
Spain	406	43	42	34	31	26	27	203
Sweden	11	1	1	1	1	1	1	7
Switzerland	14	5	4	2	1	(*)	(*)	(*)
Turkey	409	44	37	33	30	28	24	212
United Kingdom	2,084	36	90	94	97	102	109	1,555
Yugoslavia	356	30	30	26	30	20	23	196
European Atomic Energy Community	34	2	2	3	2	2	3	19
European Coal and Steel Community	57	1	1	1	2	2	2	49
Other and unspecified Western Europe	32	7	6	5	3	3	2	6
Total, other Europe	313	41	43	44	16	8	8	153
Czechoslovakia	1							1
Hungary	6	(*)	(*)	(*)	(*)	(*)	(*)	6
Poland	106	11	8	8	6	5	5	65

See footnotes at end of table.

TABLE B-11.—*Summary of interest and commissions collected on U.S. Government foreign credits, July 1, 1945, to Dec. 31, 1976, by program, and by area and country*[1]—*Continued*

[In millions of dollars and equivalents]

Major program, and area and country	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
Romania	21	6	6	2	3	3	2	(*)
U.S.S.R.	178	24	29	34	8	(*)	1	81
Total, Africa	832	96	88	84	68	62	69	365
Algeria	42	16	13	7	3	1	1	1
Angola	3	(*)	(*)	(*)	(*)	(*)	(*)	1
Botswana	1	(*)	(*)	(*)	(*)			(*)
Cameroon	6	1	1	1	1	(*)	(*)	(*)
Egypt	188	16	14	20	12	14	26	85
Ethiopia	26	3	2	2	2	2	2	12
Gabon	1	1	(*)	(*)				
Ghana	74	7	6	7	7	7	7	33
Guinea	8	2	1	1	2	(*)	(*)	1
Ivory Coast	14	3	3	3	2	1	1	2
Kenya	7	1	1	1	1	1	(*)	1
Liberia	61	3	3	3	4	4	4	41
Libya	1							1
Malawi	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Morocco	190	18	17	18	17	17	15	88
Nigeria	14	2	3	3	1	2	1	3
Senegal	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Sierra Leone	3	(*)	(*)	(*)	(*)	(*)	(*)	3
Somalia	1	(*)	(*)	(*)	(*)	(*)	(*)	1
South Africa	40	(*)						40
Sudan	11	2	2	1	1	(*)	1	4
Tanzania	6	1	1	1	1	1	(*)	2
Tunisia	68	8	8	8	9	6	6	24
Uganda	1		(*)	(*)	(*)	(*)	(*)	(*)
Zaire	30	7	7	5	4	3	2	2
Zambia	8	2	2	1	1	1	(*)	2
Other and unspecified Africa	26	2	2	1	1	1	1	18
Total, Western Hemisphere	2,865	265	241	248	155	142	157	1,657
Antigua	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Argentina	292	16	16	14	17	16	15	198
Bahamas	11	2	1	1	1	1	1	4
Bermuda	5	1	1	1	1	(*)		
Bolivia	52	6	5	5	4	4	4	25
Brazil	922	84	69	51	52	46	45	574
Cayman Islands	2	1	1	(*)				(*)
Chile	395	40	46	88	2	2	21	197
Colombia	210	21	18	16	16	14	13	112
Costa Rica	28	2	2	2	2	2	2	17
Cuba	9							9
Dominican Republic	43	7	5	6	4	4	3	12
Ecuador	48	3	3	3	3	3	3	30
El Salvador	15	2	1	1	1	1	1	7
Guatemala	20	3	2	2	2	2	2	8
Guyana	4	1	1	1	1	(*)	(*)	(*)
Haiti	13	1	(*)	(*)	(*)	(*)	(*)	12
Honduras	12	2	1	1	1	1	1	5
Jamaica	22	5	4	2	2	1	1	6
Mexico	362	32	28	20	20	19	20	222
Netherlands Antilles	1	(*)	(*)	(*)	(*)	(*)	(*)	

See footnotes at end of table.

TABLE B-11.—*Summary of interest and commissions collected on U.S. Government foreign credits, July 1, 1945, to Dec. 31, 1976, by program, and by area and country*[1]—Continued

[In millions of dollars and equivalents]

Major program, and area and country	Total (31½ years)	Calendar years						July 1, 1945, to Dec. 31, 1970
		1976	1975	1974	1973	1972	1971	
Nicaragua	19	2	2	2	2	2	1	8
Panama	43	7	6	5	3	3	2	17
Paraguay	22	2	2	1	1	2	1	13
Peru	141	12	10	10	9	6	5	88
Surinam	2	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Trinidad and Tobago	11	1	1	1	1	1	1	5
Uruguay	23	2	2	2	2	2	1	12
Venezuela	118	8	9	9	8	10	11	61
Central American Bank for Economic Integration	9	2	2	1	1	1	1	2
Other and unspecified Western Hemisphere	13	1	1	(*)	(*)	(*)	(*)	11
Total, Asia	4,439	548	394	365	373	353	324	2,082
Afghanistan	36	2	1	2	1	1	1	26
Bangladesh	14	13	1	(*)	....	....	....	(*)
Brunei	6	1	1	1	1	1	(*)	(*)
Burma	25	2	2	2	2	2	2	13
Cambodia	1	(*)	(*)	1	(*)	....	....	....
China (Taiwan)	227	46	30	20	16	13	11	91
Hong Kong	4	2	1	1	(*)	(*)	....	(*)
India	1,358	65	73	83	124	112	117	785
Indonesia	232	33	26	21	18	14	16	105
Iran	407	52	61	58	48	40	28	120
Iraq	5	(*)	(*)	(*)	(*)	(*)	1	3
Israel	540	95	58	53	48	44	30	212
Japan and Ryukyu Islands	490	38	31	28	26	28	32	308
Jordan	23	4	4	4	3	2	2	3
Korea	205	60	36	31	22	16	21	20
Kuwait	13	....	(*)	1	1	2	2	7
Lebanon	12	4	1	1	1	1	1	3
Malaysia	25	4	3	3	3	2	2	8
Nepal	1	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Pakistan	481	88	35	25	31	50	30	222
Philippines	166	19	16	17	14	13	16	71
Saudi Arabia	39	1	1	3	5	4	7	18
Singapore	13	6	4	2	1	(*)	....	(*)
Sri Lanka	26	4	4	5	3	2	2	6
Syria	7	5	....	(*)	(*)	(*)	(*)	2
Thailand	54	3	3	3	4	3	4	34
Vietnam	27	(*)	1	1	1	1	1	22
Other and unspecified Asia	1	(*)	(*)	(*)	(*)	(*)	(*)	1
Total, Oceania	243	25	25	26	37	21	27	80
Australia	202	18	20	21	33	17	24	70
New Zealand	32	6	4	3	3	3	3	10
Papua New Guinea	9	2	2	2	2	1	1	(*)
Other and unspecified Oceania	(*)	....	....	....	....	(*)	(*)	(*)
Canada	63	17	15	10	6	3	2	10
Other international organizations: United Nations	15	1	1	1	1	1	1	9

*Less than $500,000.

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note.

Source: Compiled by Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

TABLE B-12.—*Summary of U.S. Government foreign assistance through net accumulation of foreign currency claims, July 1, 1953, to Dec. 31, 1976, by program and by area and country*[1]

[In millions of dollars and equivalents]

Program and area and country	Net assistance	Currency claims acquired		Intercountry and interprogram transfers	Currency disbursed for—		
		Through farm products sales	From 2d-stage operations[2]		Economic assistance in recipient's currency		All other
					Grants	Credits	
Total, all programs and all areas	2,000	14,996	4,332		7,458	5,867	4,003
BY (FARM PRODUCTS SALES) PROGRAM							
Under Agricultural Trade Development and Assistance Act	1,970	12,922	4,332	11	6,202	5,570	3,523
Under Mutual Security Acts	31	2,031			1,255	297	447
Under Commodity Credit Corporation Charter Act	(*)	43		−11			33
BY AREA AND COUNTRY							
Total, Europe	603	3,699	397	66	782	1,090	1,687
Total, Western Europe	318	3,179	397	77	782	1,090	1,464
Austria	(*)	56		(*)	1	25	30
Belgium and Luxembourg	(*)	2		11			13
Cyprus	(*)	2	(*)	(*)		1	2
Denmark		4		1		2	3
Finland	8	48	10	(*)		23	27
France	2	251	6	−8	40	6	200
Germany	[3] −2	163		31	96		100
Greece	(*)	202	52	−2	59	99	95
Iceland	(*)	16	5	(*)	(*)	12	9
Italy	(*)	237	5	−1	24	96	120
Netherlands	(*)	9		10	7		12
Norway	(*)	2		1	1		3
Portugal	(*)	7	1	1		3	5
Spain	84	710	66	−1	158	222	311
Sweden	(*)			3			3
Switzerland	(*)			24			24
Turkey	61	526	156	−7	94	238	282
United Kingdom	(*)	216		19	96		139
Yugoslavia	164	729	96	−7	208	361	85
Other Western Europe	(*)			(*)			(*)
Other Europe: Poland	286	520		−11			223
Total, Africa	383	1,178	307	2	120	692	292
Egypt	322	809	218	−15	73	459	158
Ethiopia	(*)	3	(*)	1	3	(*)	1
Ghana	3	37	10	(*)	2	23	19
Guinea	5	32	4	−1	1	23	6
Ivory Coast	(*)	3	(*)			2	2
Libya	(*)			1	1		(*)
Mali	(*)	1	(*)			(*)	(*)
Morocco	5	88	27	9	(*)	80	37
Nigeria	(*)			1	(*)		1
Senegal	(*)	3	(*)	(*)	(*)	1	2
Somalia	(*)		(*)	1	1		(*)
South Africa	(*)	(*)		1			1

See footnotes at end of table.

TABLE B-12.—*Summary of U.S. Government foreign assistance through net accumulation of foreign currency claims, July 1, 1958, to Dec. 31, 1976, by program and by area and country*[1]—Continued

[In millions of dollars and equivalents]

Program and area and country	Net assistance	Currency claims acquired		Intercountry and interprogram transfers	Currency disbursed for—		
		Through farm products sales	From 2d-stage operations[2]		Economic assistance in recipient's currency		All other
					Grants	Credits	
Sudan	4	26	2	1	4	8	15
Tanzania	(*)	(*)	(*)				1
Tunisia	20	90	37	3	20	72	19
Zaire	23	85	7	(*)	15	24	29
Other Africa	(*)	(*)	(*)	1	(*)		1
Total, Western Hemisphere	262	898	102	(*)	86	410	242
Argentina	6	31	1	1		15	11
Bolivia	1	68	14	(*)	29	28	23
Brazil	194	510	22	−4	44	203	87
Chile	23	85	18			49	31
Colombia	16	66	22	1		40	33
Dominican Republic	(*)	(*)	1				1
Ecuador	1	12	3	1		8	6
Guatemala	(*)	9		(*)	9		(*)
Mexico	(*)	25	6	1		18	14
Paraguay	(*)	16	4	(*)	3	8	8
Peru	2	40	9	−1	(*)	25	20
Uruguay	18	36	3	(*)		16	5
Venezuela	(*)			1			1
Other Western Hemisphere	(*)	(*)	(*)	(*)			1
Total, Asia	752	9,221	3,526	−70	6,470	3,675	1,779
Afghanistan	4	6	3	(*)	1	1	4
Bangladesh	(*)	(*)	2				2
Burma	8	48	12	(*)	20	19	13
Cambodia	3	18	79		88		7
China (Taiwan)	2	493	33	−3	306	104	111
Hong Kong	1	1		5			6
India	432	4,146	2,457	−82	2,992	2,528	568
Indonesia	222	292	23	−2	32	27	31
Iran	[3] −1	64	21	(*)	9	34	43
Israel	36	412	180	−9	106	300	142
Japan	(*)	193		23	10	106	101
Jordan	(*)	6	3	(*)		4	6
Korea	18	1,030	117	−1	853	13	261
Lebanon	(*)		1	3			4
Malaysia	(*)	(*)		2			2
Nepal	14	(*)	2	21	7	(*)	2
Pakistan	136	1,321	171	−25	748	470	114
Philippines	10	142	23	(*)	66	43	45
Sri Lanka (Ceylon)	3	34	7	(*)	7	13	18
Syria	9	35	4	−1		12	18
Thailand	(*)	5	2	1		2	6
Vietnam	[3] −143	973	387	−1	1,224	1	276
Other Asia	(*)	(*)		(*)	(*)		(*)
Oceania: Australia	(*)			1			1
Canada	(*)			1			1

See footnotes on next page.

*Less than $500,000 (plus or minus).

[1] For important qualifications affecting this table and for definitions of terms, see the explanatory note.

[2] Includes foreign currencies acquired from triangular trade operations and principal and interest collections on credits, originally extended under Public Law 83-480, which—since enactment of Public Law 87-128—are available for the same purposes as Public Law 83-480 currencies.

[3] Net assistance is recorded minus (−), reflecting significant gains resulting from disbursement of foreign currency at U.S. dollar equivalent values in excess of values at which currency was acquired.

Source: Compiled by Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

SECTION C.—U.S. Government Commitments to Less Developed Countries, 1976

TABLE C–1.—*U.S. Government new loan commitments*[1] *to less developed countries in calendar year 1976, by maturity period and interest rate*

The following table includes loans reported in the U.S. submission for the OECD Development Assistance Committee Annual Aid Review. "Number of credits" is an approximation since a single commitment may be confirmed in several individual loans, or, conversely, one loan agreement may be augmented by subsequent additional commitments. Number of credits is in units; dollar amount is in millions of dollars and totals do not add due to rounding.

Maturity period (years)[2] and program	Total		Interest rate per annum[3]													
			3 percent		4–6 percent[4]		7–8 percent[5]		8¼–8½ percent[6]		8¾–9 percent[7]		9¼–9½ percent[8]		Over 10¼ percent[9]	
	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount
Total	1,208	3,977	110	2,289	14	272	707	448	26	276	338	631	3	53	10	8
OFFICIAL DEVELOPMENT ASSISTANCE																
Agricultural Trade Development and Assistance Act (Intergovernmental agreements): ATDA	52	1,024	42	836	10	188										
Foreign Assistance Act: FAA	71	1,537	68	1,453	3	84										
OTHER OFFICIAL FLOWS																
Export-Import Bank Act: EIB	613	924					550	241	25	276	35	354	3	53		
Commodity Credit Corporation Charter Act: CCC	458	480					155	203			303	277				
Overseas Private Investment Corporation: OPIC	14	12			1	(*)	2	4	1	(*)					10	8
1 to —5, total	716	493					411	215	2	1	303	277				
CCC	458	480					155	203			303	277				
EIB	257	13					256	12	1	1						
OPIC	1	(*)							1	(*)						
5 to —10, total	328	390					287	118	21	169	16	99			4	4
EIB	324	386					287	118	21	169	16	99				
OPIC	4	4													4	4

10 to —15, total	28	409					4	30	3	106	19	256	1	16	1	1
EIB	26	407					3	29	3	106	19	256	1	16		
OPIC	2	2					1	1							1	1
15 to —20, total	11	200	2	12	4	71	4	82					1	34		
ATDA	6	84	2	12	4	71										
EIB	5	116					4	82					1	34		
20 to —25, total	19	327	18	324									1	3		
ATDA	18	324	18	324												
EIB	1	3											1	3		
25+, total	9	200			9	200										
ATDA	6	116			6	116										
FAA	3	84			3	84										
30+, total	3	23	3	23												
ATDA	2	8	2	8												
FAA	1	15	1	15												
40+, total	87	1,930	87	1,930												
ATDA	20	492	20	492												
FAA	67	1,438	67	1,438												
Indeterminate: OPIC	7	6			1	(*)	1	3							5	3

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*Less than $500,000.

[1] Includes only credits repayable in U.S. dollars. This table excludes the following entries incorporated into the U.S. submission to OECD: commitments for debt reorganization, rescheduling, and capitalization of interest totaling $357,000,000; 744 individual transactions totaling $582,000,000, reported as having occurred through the Export-Import Bank "Discount Loan Facility," whereby U.S. commercial banks borrow funds from the Bank for on-lending to foreign purchasers; and 1 loan at $45,000, under the Bank's "Cooperative Financing Facility," whereby an individual export loan has been authorized by the Bank through a U.S. cooperating bank which has assumed the credit risk of its foreign customer. The Development Assistance Committee excludes from its consideration credits financing sales of military equipment which totaled $1,750,000,000.

[2] Maturity period is estimated upon assumption that credits are utilized concurrent with authorization, and represents the interval from authorization to final repayment. Maturity period includes any grace period (generally in the first 10 years of 40-year loans) during which time principal installments are nil.

[3] Interest rate specified is that generally prevailing over the greater part of the maturity period; for most credits stated at 3 percent, interest rate during the grace period or during the interval to first principal repayment may be 2 percent.

[4] Includes 6 ATDA credits ($116,000,000) stated at 4 percent, for which interest rate during the grace period or during the interval to first principal repayment is 3 percent; 4 ATDA credits ($71,000,000) at 4½ percent; FAA credits at 5 percent; and OPIC credit at 6 percent.

[5] Includes 1 OPIC credit ($3,000,000) at 7 percent; CCC credits, 549 EIB credits ($240,000,000), and 1 OPIC credit ($1,000,000) at 8 percent; and 1 EIB credit ($1,000,000) at 8.100 percent.

[6] Includes 3 EIB credits ($7,000,000) at 8¼ percent; and 22 EIB credits ($269,000,000) and OPIC credit at 8½ percent.

[7] Includes 17 EIB credits ($108,000,000) at 8¾ percent; CCC credits at 8 percent for nine-tenths of each credit, with the remaining part of each payment (guaranteed by U.S. banks) at 9 percent; and 18 EIB credits ($247,000,000) at 9 percent.

[8] Includes 1 credit ($16,000,000) at 9¼ percent; and 2 credits ($37,000,000) at 9½ percent.

[9] Includes 2 credits ($2,000,000) at 10¼ percent; 3 credits ($2,000,000) at 10½ percent; 4 credits ($3,000,000) at 11 percent; and 1 credit ($1,000,000) at 12 percent.

Source: Compiled by Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies.

TABLE C-2.—*Analysis of terms of U.S. Government commitments*[1] *for all Official Development Assistance (ODA) to less developed countries in calendar year 1976*

[Amounts in millions of dollars]

Program[2]	Commitment			Measures of loan concessionality		
	Volume (amount)	Grant equivalent[3] (amount)	Grant equivalent[3] (percent)[4]	Maturity[5] (years)	Interval to first repayment[6] (years)	Effective interest rate[7] (percent)
Total	7,063.83	6,045.73	85.59*			
Of which bilateral	5,527.25	4,509.15	81.58*			
GRANTS	4,078.26	4,078.26	100.00			
Bilateral	2,541.68	2,541.68	100.00			
Multilateral	1,536.58	1,536.58	100.00			
Capital subscription payments	1,078.25	1,078.25	100.00			
Other	458.33	458.33	100.00			
GRANT-LIKE[8]	76.72	76.72	100.00			
LOANS[9]	2,908.85	1,890.75	65.00*	35.8*	9.4*	2.70*
New ODA	2,561.17	1,651.52	64.48*	36.3*	9.2*	2.79*
FAA	1,438.22	1,023.40	71.16*	41.0	11.0	2.63*
ATDA	492.24	336.18	68.30*	40.7*	10.7*	2.58*
FAA	15.00	10.18	67.86	31.0	11.0	2.51
ATDA	7.51	4.47	59.46*	30.4*	6.4*	2.65*
ATDA	116.45	57.89	49.71*	25.6*	6.6*	3.59*
ATDA	14.16	6.75	47.68*	24.3*	3.3*	3.00*
ATDA	309.99	146.92	47.40*	20.7*	2.7*	2.65*
FAA	84.00	36.02	42.88	26.0	6.0	5.00
ATDA	12.35	5.17	41.83*	19.5*	1.5*	2.87*
ATDA	71.25	24.54	34.44*	16.7*	2.7*	4.16*
Debt reorganization	347.68	239.23	68.81*	31.6*	10.5*	2.00*
Multiple rescheduling[10]	333.60	230.78	69.18*	31.6*	10.6*	1.97*
Incremental capitalized interest:[11] ATDA	14.08	8.45	59.98*	33.5*	7.8*	2.72*
Memo item:						
EXCLUDING DEBT REORGANIZATION						
Total	6,716.15	5,806.50	86.46*			
Of which bilateral	5,179.57	4,269.92	82.44*			

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*Volume-weighted average of individual commitments.

[1] Commitments for grants and loans as reported in the U.S. submission for the OECD Development Assistance Committee Annual Aid Review (1977). *Official Development Assistance* (ODA) is defined to include each transaction which is administered with the promotion of economic development and welfare of developing countries as its main objective and which is concessional in character, containing a *grant element* (see footnote 4) of at least 25 percent.

[2] ATDA—Agricultural Trade Development and Assistance Act

FAA—Foreign Assistance Act

[3] *Grant equivalent* measures grants *plus* an estimate of the interest foregone on loans. The latter estimate is the difference between the present values of (a) the actual projected amortization of principal and interest at the contracted rate and (b) an assumed projected amortization of principal and interest at a standardized 10 percent.

[4] This percentage is termed the *grant element*. It provides—for loans—a single indicator of loan concessionality ("softness"), combining the three terms parameters shown in the adjacent tabular columns and discussed in footnotes 5, 6, and 7.

[5] *Maturity period* (M) includes any interval to first repayment during which time principal installments are nil. The maturity date for FAA credits is generally 40 years from the date of first disbursement; a standard estimate of 1 year for the interval to first disbursement from date of commitment is used. For ATDA credits, the maturity date is generally determined in years from the date of the last delivery; such date of last delivery is estimated from the authorization stipulated in each agreement. Where a credit agreement is augmented by amendment within the current (reporting) year, the earliest date of authorization in the current year is used for calculating maturity period.

[6] *Interval to first repayment* (IFR) is measured in a manner comparable to that for maturity outlined in footnote 3.

[7] *Effective interest rate* (EIR) is calculated for each ODA credit having multiple interest rates, including those credits with a lower interest rate prevailing during the interval to first repayment. The formula used for calculating effective interest rate is $EIR = (2i(IFR) + j(M-IFR))/(M+IFR)$, where i=initial interest rate and j=continuing interest rate.

[8] Includes credits repayable in borrowers' currency.

[9] Includes only credits with a grant element of at least 25 percent and repayable in U.S. dollars.

[10] Represents assumption by Bangladesh of indebtedness on obligation (on ODA credits) and a concomitant debt reorganization with Bangladesh ($107,560,000) (multiple rescheduling) under agreement of March 3, 1976 (published in *Treaties and Other International Act Series* 8423), and debt reorganization with Pakistan ($226,040,000) under agreement of March 4, 1976 (*TIAS* 8447). Excludes outstanding indebtedness on *Other Official Flows* (OOF) loans ($2,570,000) recognized in these agreements as being assumed by the Government of Bangladesh.

[11] *Incremental capitalized interest* (ICI) transactions represent the volume of capitalized interest that has not been previously incorporated as a commitment in the OECD reporting series. Such commitments—under what may be termed "bisque clauses"—may actually have been made in the original agreement or in a subsequent amendment. For statistical convenience, these transactions are reported as current year increments because the basic loan accounting systems do not normally tabulate such "bisque agreement" amounts when the original agreement is made. A grant element has been indicated for such ICI transaction in the calendar year, based upon the approximate terms of the original agreement. Maturity period, IFR, and EIR are the approximate categorical terms parameters of the original agreement.

The exercise of U.S. Government option to collect a *currency-use payment* (CUP) results in the decrease of the principal amount outstanding on an ATDA credit until the currency-use payment is applied as meeting an interest installment otherwise due according to the credit repayment schedule. At such time, interest is entered as an imputed collection, and an equivalent addition to principal outstanding (i.e., a disbursement) is recorded. All of the incremental capitalizations of interest reported for ATDA credits are the consequence of such currency use payment transactions.

Source: Compiled by Bureau of Economic Analysis, U.S. Department of Commerce, from information made available by operating agencies, for U.S. Annual Aid Review submission to the OECD Development Assistance Committee.

SECTION D.—International Monetary Fund

TABLE D-1.—*International Monetary Fund currency sales, July 1, 1976 to June 30, 1977, by country and currency*

[In millions of SDR's]

Country	Total	Currencies[1]	SDR's	Country	Total	Currencies[1]	SDR's
Total	4,836.4	4,542.5	293.9	Malawi	5.4	5.4	....
Argentina	159.5	159.5	....	Malaysia	93.0	93.0	....
Australia	332.5	332.5	....	Mauritania	4.7	4.7	....
Bahrain	5.0	5.0	....	Mauritius	5.5	5.5	....
Bangladesh	41.5	32.0	9.5	Mexico	516.9	516.9	....
Barbados	3.5	3.5	....	New Zealand	50.5	50.5	....
Burma	15.0	13.0	2.0	Pakistan	119.5	102.6	16.9
Cameroon	17.5	17.5	....	Panama	18.0	18.0	....
Chad	6.5	6.5	....	Philippines	168.8	138.8	30.0
Congo, P.D.R.	13.2	13.2	....	Portugal	100.9	87.7	13.2
Dominican Republic ...	36.5	35.5	1.0	Romania	17.5	16.7	.8
Ecuador	17.6	17.6	....	Sierra Leone	5.5	5.5	....
Egypt	63.0	48.0	15.0	South Africa	472.0	442.0	30.0
Gambia, The	5.2	4.7	.5	Sri Lanka	15.8	15.8	....
Germany	49.4	49.4	....	Syria	12.5	12.5	....
Greece	58.0	58.0	....	Tanzania	4.7	....	4.7
Grenada	.2	.1	.1	Thailand	67.0	67.0	....
Guyana	22.3	22.3	....	Togo	7.5	7.5	....
Haiti	3.0	1.5	1.5	United Kingdom	1,930.0	1,800.0	130.0
Israel	77.0	67.0	10.0	Viet Nam	46.5	41.5	5.0
Italy	90.0	90.0	....	Western Samoa	1.0	.9	.1
Jamaica	26.6	24.6	2.0	Zaire	74.3	64.3	10.0
Kenya	24.0	19.0	5.0	Zambia	27.5	20.9	6.6
Liberia	4.6	4.6	....				

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[1] Sales of U.S. dollars during the period were equivalent to SDR 2,091.5 million.

NOTE.—Detail may not add to totals due to rounding.

Source: International Monetary Fund.

TABLE D-2.—*International Monetary Fund currency sales by currency sold, calendar years, through June 30, 1977*

[In millions of SDR's]

Period	Total	U.S. dollars	Deutsche marks	Italian lire	Canadian dollars	French francs	Pounds sterling	Other[1]
Total	42,644.5	13,692.9	6,294.2	1,993.8	2,139.0	2,604.2	1,499.6	14,420.8
1977 (1st half) ..	2,482.0	1,141.3	531.7	....	50.7	63.8	....	694.5
1976	6,508.0	2,720.0	324.2	....	308.5	400.6	....	2,754.7
1975	4,557.1	1,182.2	280.0	....	43.0	224.9	97.7	2,729.3
1974	4,021.2	1,199.5	474.5	....	60.5	137.3	89.0	2,060.4
1973	687.6	....	323.8	18.8	33.6	82.2	....	229.2
1972	1,255.2	....	412.2	59.7	79.8	144.4	257.1	302.0
1971	1,900.3	10.0	228.8	60.9	85.5	100.1	27.9	1,387.1
1970	1,509.3	453.9	333.8	70.3	81.1	....	43.3	526.9
1969	2,461.2	1,031.1	311.0	197.0	278.5	....	4.0	639.6
1968	3,517.4	790.2	836.0	476.0	138.5	79.5	....	1,197.2
1967	834.7	113.6	89.8	46.0	30.0	82.0	247.2	226.1
1966	1,448.3	158.8	239.5	311.8	459.8	77.0	82.4	119.0
1965	2,433.5	282.2	418.1	473.8	290.5	376.8	29.0	563.1
1964	1,949.8	281.9	718.1	31.3	99.0	356.8	7.3	455.4
1963	333.2	193.7	37.5	28.0	....	20.0	5.0	49.0
1947–62	6,745.9	4,134.3	735.3	220.2	100.0	459.0	609.8	487.3

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[1] Consisting of Argentine pesos, Australian dollars, Austrian Schillings, Bahrain dinars, Belgian francs, Brazilian cruzeiros, Danish kroner, Ecuadoran sucres, Finnish markaa, Indonesian rupiahs, Iranian rials, Irish pounds, Japanese yen, Kuwaiti dinars, Luxembourg francs, Malaysian ringgits, Maltese pounds, Mexican pesos, Netherlands guilders, Nigerian naira, Norwegian kroner, Omani rials, Qatar riyals, Saudi Arabian riyals, South African rand, Spanish pesetas, Swedish kronor, Trinidad & Tobago dollars, U.A.E. dirhams, Venezuelan bolivares, and SDR's.

NOTE.—Detail may not add to totals due to rounding.

Source: International Monetary Fund.

TABLE D-3.—*International Monetary Fund currency repurchases, by currency of repurchase, calendar years, through June 30, 1977*

[In millions of SDR's]

Period	Total	U.S. dollars	Deutsche marks	Italian lire	Canadian dollars	French francs	Other	SDR's	Gold
Total	[1] 20,414.2	5,954.7	3,015.6	999.4	1,296.2	941.6	[2] 4,784.6	1,844.1	1,578.0
1977 (1st half)	1,332.4	746.7	220.1	....	12.7	31.6	111.9	209.4	....
1976	1,272.0	465.8	128.7	....	28.6	73.5	129.6	445.8	....
1975	492.1	121.7	122.7	....	18.1	29.9	162.6	37.1	....
1974	627.7	....	257.2	27.0	26.2	25.2	273.9	18.2	....
1973	635.1	....	189.7	39.6	59.5	51.2	246.4	45.5	3.1
1972	1,526.7	....	337.3	75.2	93.9	120.7	374.9	494.3	30.4
1971	2,812.9	38.3	63.0	.3	351.3	44.5	1,535.4	301.5	478.6
1970	1,403.9	742.0	3.8	67.8	40.4	....	242.1	292.3	15.5
1969	1,585.1	267.7	391.8	271.4	43.2	.1	528.6	....	82.3
1968	1,286.2	....	281.6	327.5	7.3	90.5	493.6	....	85.7
1967	923.4	....	295.2	89.0	45.1	184.0	299.3	....	10.8
1966	480.4	.5	14.7	7.5	412.2	23.1	11.0	....	11.4
1965	381.7	....	121.9	38.5	107.1	19.0	53.9	....	41.4
1964	513.4	4.8	264.6	5.5	....	125.2	93.5	....	19.8
1963	299.2	206.6	2.9	5.0	....	8.0	28.2	....	48.5
1947–1962	4,841.9	3,360.6	320.4	45.0	50.7	115.0	199.7	....	750.6

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[1] Includes SDR 406 million of repurchases on subscription account and SDR 324.4 million of repurchases of charges paid in currencies.

[2] Consisting of Argentine pesos, Australian dollars, Austrian schillings, Belgian francs, Danish kroner, Iranian rials, Irish pounds, Japanese yen, Kuwaiti dinars, Maltese pounds, Mexican pesos, Netherlands guilders, Norwegian kroner, pounds sterling, Qatar riyals, Saudi Arabian riyals, South African rand, Spanish pesetas, Swedish kronor, United Arab Emirates dirhams and Venezuelan bolivares.

NOTE.—Detail may not add to totals due to rounding.

Source: International Monetary Fund.

TABLE D-4.—*International Monetary Fund special drawing account—report on holdings by IFS grouping*

[As of June 30, 1977]

Participants	Allocations	Net receipts or net use (−)	SDR holdings[1] Amount	SDR holdings[1] Percent of allocations
Industrial Countries	6,177.7	769.8	6,947.5	112.5
United States	2,294.0	−161.9	2,132.1	92.9
Canada	358.6	85.5	444.1	123.8
Japan	377.4	116.8	494.2	130.9
Austria	76.7	19.8	96.6	125.8
Belgium	209.4	197.8	407.1	194.5
Denmark	82.8	14.3	97.1	117.3
France	485.0	−251.9	233.1	48.1
Germany	542.4	1,083.2	1,625.6	299.7
Italy	318.0	−205.2	112.8	35.5
Luxembourg	7.3	.1	7.4	101.4
Netherlands	236.5	340.4	576.9	244.0
Norway	76.3	16.5	92.8	121.6
Sweden	107.0	......	107.0	100.0
Switzerland	......	......	......	......
United Kingdom	1,006.3	−485.7	520.6	51.7
Other Europe	405.1	−199.6	205.6	50.8
Finland	61.5	−12.5	49.0	79.7
Greece	46.2	−30.0	16.2	35.2
Iceland	7.4	−4.8	2.6	35.4
Ireland	39.2	6.3	45.6	116.2
Malta	5.1	.4	5.5	107.9
Portugal	......	7.0	7.0	......
Romania	......	8.2	8.2	......
Spain	126.1	−57.0	69.1	54.8
Turkey	50.3	−50.3	......	......
Yugoslavia	69.3	−66.9	2.4	3.4
Australia, New Zealand, South Africa	384.0	−309.8	74.2	19.3
Australia	225.6	−199.9	25.8	11.4
New Zealand	69.4	−48.8	20.6	29.6
South Africa	88.9	−61.1	27.9	31.3
Oil Exporting Countries	374.2	−17.6	356.6	95.3
Algeria	40.3	5.9	46.2	114.5
Indonesia	90.2	−81.5	8.7	9.7
Iran	61.9	4.7	66.6	107.6
Iraq	23.2	10.0	33.2	142.9
Kuwait	......	......	......	......
Libya	......	......	......	......
Nigeria	45.6	20.2	65.8	144.3
Oman	.7	......	.7	100.0
Qatar	......	......	......	......
Saudi Arabia	......	......	......	......
United Arab Emirates	......	......	......	......
Venezuela	112.3	23.2	135.5	120.6
Other Less Developed Areas	1,974.0	−969.1	1,004.7	50.9
Other Western Hemisphere	766.8	−305.4	461.4	60.2
Argentina	152.5	−85.5	67.0	43.9
Bolivia	12.8	−6.1	6.7	52.2
Brazil	152.5	20.7	173.2	113.6
Chile	54.7	−.3	54.4	99.5
Colombia	54.4	−31.4	23.1	42.4
Costa Rica	11.0	−7.6	3.5	31.4
Dominican Republic	14.5	−9.4	5.2	35.6

See footnotes at end of table.

TABLE D-4.—*International Monetary Fund special drawing account—report on holdings by IFS grouping* —Continued

[As of June 30, 1977]

Participants	Allocations	Net receipts or net use (−)	SDR holdings[1]	
			Amount	Percent of allocations
Ecuador	11.2	−3.0	8.2	73.0
El Salvador	11.7	−5.7	5.9	50.8
Guatemala	11.9	−.4	11.5	96.8
Haiti	6.6	−4.7	1.9	29.2
Honduras	8.5	−6.7	1.9	21.9
Mexico	124.2	−68.1	56.1	45.2
Nicaragua	8.9	−5.0	3.9	43.6
Panama	12.4	−8.6	3.8	30.9
Paraguay	6.6		6.6	100.2
Peru	40.5	−39.7	.8	2.1
Uruguay	23.9	−16.2	7.7	32.2
Bahamas				
Barbados	2.8		2.8	99.3
Grenada		.1	.1	
Guyana	6.8	−3.7	3.1	45.9
Jamaica	17.7	−14.7	3.0	16.9
Trinidad and Tobago	20.8	−9.6	11.2	53.8
Other Middle East	153.6	−94.2	59.4	38.7
Bahrain				
Cyprus	8.9	−2.4	6.5	73.4
Egypt	65.2	−40.7	24.5	37.6
Israel	42.8	−33.8	9.0	21.0
Jordan	7.6	−.2	7.4	97.1
Lebanon				
Syria	17.0	−10.7	6.4	37.4
Yemen Arab Republic	2.1		2.1	100.0
Yemen, People's Democratic Republic	9.9	−6.4	3.5	35.2
Other Asia	674.9	−344.0	330.8	49.0
Afghanistan	12.8	−10.0	2.7	21.3
Bangladesh		10.3	10.3	
Burma	20.8	−13.5	7.3	35.0
Cambodia	8.5	−8.5		.1
China, Republic of				
India	326.2	−141.6	184.6	56.6
Korea	22.2	−15.1	7.1	32.1
Laos, People's Democratic Republic	4.5	−2.8	1.6	36.4
Malaysia	60.6	−36.0	24.6	40.5
Nepal	2.2	−.2	2.0	91.0
Pakistan	81.6	−48.3	33.4	40.9
Philippines	51.5	−44.7	6.8	13.2
Singapore				
Sri Lanka	34.0	−22.0	12.0	35.2
Thailand	28.5	2.7	31.3	109.6
Viet Nam	19.8	−14.9	4.9	24.5
Fiji	1.4		1.3	97.1
Papua New Guinea		1.0	1.0	
Western Samoa	.2	−.2		14.3
Other Africa	378.7	−225.5	153.1	40.4
Benin	4.5		4.4	99.8
Botswana	1.6		1.6	100.0
Burundi	6.6	−3.7	2.9	43.5
Cameroon	10.5	−2.7	7.8	74.0

See footnotes at end of table.

TABLE D-4.—*International Monetary Fund special drawing account—report on holdings by IFS grouping* —Continued

[As of June 30, 1977]

Participants	Allocations	Net receipts or net use (−)	SDR holdings[1]	
			Amount	Percent of allocations
Central African Empire	4.4	−2.7	1.7	38.5
Chad	4.5	−2.9	1.6	36.0
Comoros	......	......	......	......
Congo, People's Republic	4.5	−2.6	1.9	41.6
Equatorial Guinea	2.7	−1.0	1.7	64.2
Ethiopia	......	......	......	......
Gabon	4.8	−.2	4.6	96.2
Gambia, The	2.3	−1.4	.9	40.3
Ghana	30.1	−20.8	9.3	31.0
Guinea-Bissau	......	......	......	......
Guinea Republic	8.3	−5.8	2.5	29.6
Ivory Coast	14.3	−7.2	7.1	49.8
Kenya	15.6	−10.9	4.7	29.9
Lesotho	1.6	−1.1	.5	28.7
Liberia	9.5	−6.2	3.3	34.9
Madagascar	8.7	−6.7	2.1	23.8
Malawi	5.1	−1.0	4.1	80.9
Mali Republic	7.5	−4.9	2.6	34.9
Mauritania	4.5	−3.6	.8	18.4
Mauritius	7.4	−4.9	2.5	34.1
Morocco	39.2	−31.6	7.6	19.4
Niger	4.5	−.1	4.4	98.4
Rwanda	6.6	−4.3	2.3	34.9
Senegal	11.4	−8.8	2.6	23.6
Seychelles	......	......	......	......
Sierra Leone	7.8	−5.7	2.1	27.0
Somalia	6.6	−2.4	4.2	63.6
Sudan	24.9	−24.9	......	......
Swaziland	2.7	−1.8	.9	32.1
Tanzania	14.3	−6.0	8.4	58.4
Togo	5.1	−.2	4.9	96.1
Tunisia	14.7	−4.9	9.8	66.5
Uganda	13.9	−8.5	5.5	39.2
Upper Volta	4.5	......	4.4	99.3
Zaire	39.2	−25.7	13.5	34.5
Zambia	24.6	−10.5	14.1	57.3
Participants' holdings	9,314.8	−726.2	8,588.6	92.2
General account	......	726.2	726.2	......
Total holdings	9,314.8	......	9,314.8	......

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[1] The SDR is defined as equivalent to .888671 gram of fine gold, i.e., equivalent to the U.S. dollar at its par value of December 1946.

Source: International Monetary Fund.

TABLE D-5.—*IMF Standby arrangements—amounts available under arrangements in effect on June 30, 1977*

[In millions of SDR's]

Country	Date of		Amounts			
	Arrangement	Expiration	Amount	Augmentation	Drawn	Available
Total			4,736.9	770.0	2,669.8	2,837.1
Argentina	Aug. 6, 1976	Aug. 5, 1977	260.0		159.5	100.5
Burma	May 6, 1977	May 5, 1978	35.0		15.0	20.0
Congo, People's Republic	Jan. 1, 1977	Dec. 31, 1977	4.7		4.7	NIL
Costa Rica	July 23, 1976	July 22, 1977	11.6			11.6
Egypt	Apr. 20, 1977	Apr. 19, 1978	125.0		63.0	62.0
Gambia, The	May 18, 1977	May 17, 1978	2.5			2.5
Haiti	Aug. 2, 1976	Aug. 1, 1977	6.9		3.0	3.9
Israel	Oct. 20, 1976	Oct. 19, 1977	29.2		12.0	17.2
Italy	Apr. 25, 1977	Dec. 31, 1978	450.0		90.0	360.0
Korea	May 6, 1977	Dec. 31, 1977	20.0			20.0
Mauritania	May 25, 1977	May 24, 1978	4.7		4.7	NIL
Pakistan	Mar. 9, 1977	Mar. 8, 1978	80.0		20.0	60.0
Panama	Apr. 6, 1977	Apr. 5, 1978	11.2			11.2
Portugal	Apr. 25, 1977	Apr. 24, 1978	42.4		42.4	NIL
Sierra Leone	June 3, 1977	June 2, 1978	9.0			9.0
South Africa	Aug. 6, 1976	Aug. 5, 1977	152.0	160.0	312.0	NIL
United Kingdom	Jan. 3, 1977	Jan. 2, 1979	3,360.0	610.0	1,930.0	2,040.0
Uruguay	Aug. 4, 1976	Aug. 3, 1977	25.0			25.0
Western Samoa	Jan. 31, 1977	Jan. 30, 1978	.6			.6
Zaire	Apr. 25, 1977	Apr. 24, 1978	45.0		5.0	40.0
Zambia	July 30, 1976	July 29, 1977	62.0		8.5	53.5

NOTE.—Detail may not add to totals due to rounding.

Source: International Monetary Fund.

TABLE D-6.—*Fund borrowings under the General Arrangements to Borrow, from inception to June 30, 1976 and from July 1976 to June 1977*

[Expressed in millions of SDR's]

	Arrangements[1]	Cumulative operations inception—June 30, 1976			Available June 30, 1976	Operation During July 1976 to June 1977		Available June 30, 1977
		Borrowings	Transfers of Claims	Repayments		Borrowings	Repayments	
Belgium	178.9	137.5	10.0	147.5	164.9	25.0		154.0
Canada	175.2	140.0	30.0	170.0	194.7	29.7		146.5
France	473.4	240.0	–140.0	100.0	500.0	32.0		441.8
Germany	1,462.1	897.5	–130.0	767.5	1,357.4	388.8		1,073.8
Italy	333.6	335.0	105.0	440.0	333.1			333.6
Japan	[2]1,077.3	150.0	85.0	235.0	263.2	275.8		784.0
Netherlands	250.0	177.5	40.0	217.5	231.4	54.2		196.7
Sweden	[3]100.5	77.5		77.5	101.8	11.3		89.8
Switzerland	337.5					125.4		212.1
United Kingdom	528.3				572.3			528.3
United States	1,715.5				1,745.1	467.7		1,248.4
Total	6,632.3	2,155.0		2,155.0	[1]5,463.8	1,410.0		5,208.5

[1] Since lending commitments are expressed in national currency, their amounts expressed in SDR's change with changes in a country's par value or exchange rate. (1 SDR equals $1 prior to May 8, 1972, $1.08571 to Oct. 18, 1973, $1.20635 through June 30, 1974, and is valued daily by a "basket" of currencies since July 1, 1974.)

[2] The credit arrangement with Japan has been increased from 90 billion yen to 340 billion yen in December 1976.

[3] The Borrowing Arrangement with the Swiss National Bank has been made in January 1977.

NOTE.—Detail may not add to totals due to rounding.

Source: International Monetary Fund.

TABLE D-7.—*International Monetary Fund—Compensatory Financings Facility Drawings*

[Millions of SDR's]

	Period (calendar years)				
	Cumulative 1963–1974	1975	1976	Jan.–June 1977	Cumulative 1963–77 (June)
All Countries	982.3	239.0	2,308.1	119.3	3,648.6
Industrial	36.7	88.3	854.3	....	979.2
Australia	....	....	332.5	....	332.5
Greece	....	....	58.0	....	58.0
Iceland	7.5	....	11.5	....	19.0
New Zealand	29.2	50.5	101.0	....	180.7
Portugal	....	....	58.5	....	58.5
Romania	....	....	95.0	....	95.0
South Africa	....	....	160.0	....	160.0
Turkey	......	37.8	37.8	....	75.5
Less Developed	945.6	150.8	1,453.8	119.3	2,669.4
Africa	103.2	37.0	305.3	57.3	502.8
Burundi	2.5	....	....	....	2.5
Cameroon	....	....	17.5	....	17.5
Central African Empire	....	....	5.1	....	5.1
Chad	....	....	6.5	....	6.5
Congo P.D.R.	....	....	....	6.5	6.5
Gambia, The	....	....	....	3.5	3.5
Ghana	17.3	....	....	....	17.3
Guinea	6.0	....	....	....	6.0
Ivory Coast	....	....	26.0	....	26.0
Kenya	....	....	24.0	....	24.0
Mauritania	....	....	6.5	....	6.5
Morocco	....	....	56.5	....	56.5
Sierra Leone	....	....	12.5	....	12.5
Sudan	11.3	18.0	26.7	....	56.0
Tanzania	....	....	21.0	....	21.0
Togo	....	....	7.5	....	7.5
Uganda	....	....	20.0	....	20.0
Zaire	28.2	....	56.5	28.3	113.0
Zambia	38.0	19.0	19.0	19.0	95.0
Asia	382.3	3.8	436.6	58.5	881.2
Afghanistan	4.8	....	....	....	4.8
Bangladesh	62.5	....	39.1	....	101.6
Burma	29.0	....	....	....	29.0
Cambodia	12.5	....	....	....	12.5
India	152.0	....	....	....	152.0
Korea	....	....	40.0	....	40.0
Laos	......	3.3	3.3	....	6.5
Malaysia	....	....	93.0	....	93.0
Pakistan	....	....	90.5	27.0	117.5
Papua New Guinea	....	....	10.0	....	10.0
Philippines	38.8	....	77.5	....	116.3
Sri Lanka	82.8	....	15.8	....	98.6
Thailand	....	....	67.0	....	67.0
Viet Nam	....	....	....	31.0	31.0
Western Samoa	......	.5	.5	.5	1.5
Middle East	132.8	....	174.5	....	307.3
Cyprus	....	....	13.0	....	13.0
Egypt	86.0	....	94.0	....	180.0
Iraq	17.5	....	....	....	17.5
Israel	....	....	65.0	....	65.0

See footnote at end of table.

TABLE D-7.—*International Monetary Fund—Compensatory Financings Facility Drawings*—Continued

[Millions of SDR's]

	Period (calendar years)				
	Cumulative 1963–1974	1975	1976	Jan.–June 1977	Cumulative 1963–77 (June)
Jordan	7.3				7.3
Syria	22.0				22.0
Yemen (PDR)			2.5		2.5
Latin America	327.2	110.0	537.4	3.5	978.1
Argentina	64.0	110.0	110.0		284.0
Barbados				3.5	3.5
Brazil	60.0				60.0
Chile	79.0		79.0		158.0
Colombia	20.8				20.8
Dominican Republic	6.6		21.5		28.1
Ecuador	6.3				6.3
El Salvador	6.3				6.3
Guatemala	6.3				6.3
Guyana	5.0		10.0		15.0
Haiti	2.3				2.3
Jamaica	13.3		26.5		39.8
Mexico			185.0		185.0
Panama			18.0		18.0
Peru	30.8		61.5		92.3
Uruguay	26.8		25.9		52.7

Source: International Monetary Fund.

TABLE D-8.—*International Monetary Fund—Oil Facility Drawings*

[Millions of SDR's]

	Period (calendar years)			
	1974	1975	1976	Cumulative 1974–77 (June)
All Countries	1,715.8	3,043.2	2,143.4	6,902.4
Industrial	951.3	1,768.8	1,643.3	4,363.4
Finland		71.3	115.1	186.4
Greece	36.2	119.0		155.2
Iceland	15.5	10.1	13.6	39.2
Italy	675.0	780.2		1,455.2
New Zealand	85.7	106.1	46.9	238.7
Portugal			114.8	114.8
Spain		496.2	75.9	572.1
Turkey		169.8	91.5	261.3
United Kingdom			1,000.0	1,000.0
Yugoslavia	139.0	16.2	185.5	340.7
Less Developed	764.5	1,274.4	500.1	2,539.0
Africa	130.0	238.9	95.7	464.6
Burundi		1.2		1.2
Cameroon	4.6	7.5	4.3	16.4
Central African Republic	2.7	2.3	1.0	6.0
Chad	2.2			2.2
Ghana		38.6		38.6
Guinea	3.5			3.5

See footnote at end of table.

TABLE D-8.—*International Monetary Fund—Oil Facility Drawings*—Continued

[Millions of SDR's]

	Period (calendar years)			
	1974	1975	1976	Cumulative 1974–77 (June)
Ivory Coast	11.2	......	10.4	21.6
Kenya	32.0	28.8	3.1	63.9
Madagascar	3.5	10.9	......	14.4
Malawi	......	2.4	1.4	3.8
Mali	4.0	1.0	4.0	9.0
Mauritania	......	......	5.3	5.3
Morocco	......	......	18.0	18.0
Senegal	......	25.4	......	25.4
Sierra Leone	4.3	.6	5.0	9.9
Sudan	28.7	18.3	......	47.0
Tanzania	28.4	23.8	......	52.2
Uganda	5.0	14.2	......	19.2
Zaire	......	45.0	32.5	77.5
Zambia	......	18.9	10.8	29.7
Asia	463.0	577.3	187.2	1,227.5
Bangladesh	40.4	36.7	14.7	91.8
Fiji	.3	......	......	.3
India	200.0	201.3	......	401.3
Korea	90.0	107.3	55.4	252.7
Pakistan	97.9	103.4	34.7	236.0
Papua New Guinea	......	......	14.8	14.8
Philippines	......	96.9	55.2	152.1
Sri Lanka	34.0	31.3	12.4	77.7
Western Samoa	......	.3	.2	.5
Middle East	15.7	152.1	61.1	228.9
Cyprus	6.4	1.7	22.0	30.1
Egypt	......	......	31.7	31.7
Israel	......	143.3	......	143.3
Yemen (PDR)	9.3	7.1	7.4	23.8
Latin America	156.1	306.1	156.1	618.3
Argentina	......	76.1	......	76.1
Chile	41.5	156.8	45.4	243.7
Costa Rica	18.8	12.0	6.8	37.6
El Salvador	17.9	......	......	17.9
Grenada	......	.3	.2	.5
Haiti	3.8	2.6	2.6	9.0
Honduras	16.8	......	......	16.8
Jamaica	......	......	29.2	29.2
Nicaragua	3.3	12.2	......	15.5
Panama	7.4	10.2	7.1	24.7
Peru	......	......	52.7	52.7
Uruguay	46.6	35.0	12.1	94.6

Source: International Monetary Fund.

SECTION E.—International Bank for Reconstruction and Development

TABLE E–1.—*IBRD loans approved by country and purpose, July 1, 1976 to June 30, 1977*

[Millions of dollars]

Country	Amount	Purpose
Algeria	48.5	Education
	41.5	Transportation
	80.0	Transportation
Argentina	105.0	Transportation
*	115.0	Power
*	100.0	Development Finance Companies
Bahamas *	10.0	Water Supply & Sewerage
Bolivia	11.5	Water Supply & Sewerage
	12.0	Development Finance Companies
	15.0	Education
*	25.0	Transportation
*	35.0	Transportation
Botswana	20.0	Transportation
Brazil	88.0	Agriculture
	32.0	Education
*	40.0	Water Supply & Sewerage
*	82.0	Power
*	42.0	Agriculture
*	64.0	Industry
*	82.0	Industry
Cameroon	18.0	Agriculture
	7.0	Agriculture
*	15.0	Transportation
Chile	25.0	Agriculture
*	35.0	Power
Colombia	52.0	Agriculture
	90.0	Transportation
*	64.0	Agriculture
*	60.0	Telecommunications
*	15.0	Development Finance Companies
Congo, People's Republic of the	8.0	Education
Costa Rica	18.0	Agriculture
Cyprus	10.0	Transportation
Dominican Republic	5.0	Transportation
	5.0	Population & Family Health
Ecuador	26.0	Development Finance Companies
	17.5	Transportation
	15.5	Agriculture
Egypt, Arab Republic of	27.0	Agriculture
	12.0	Agriculture
	70.0	Industrial Import Program
	2.5	Industry
*	56.0	Water Supply & Sewerage
*	48.0	Power
El Salvador	6.7	Urban Development
Ghana*	39.0	Power
*	9.0	Power
Greece	36.0	Water Supply & Sewerage
	35.0	Agriculture
Guatemala	4.2	Earthquake Reconstruction
	2.3	Earthquake Reconstruction
	20.0	Earthquake Reconstruction
*	55.0	Power
Honduras	28.0	Transportation
	7.0	Transportation
	5.0	Transportation
*	7.0	Transportation
India	80.0	Telecommunications
	14.0	Agriculture
	150.0	Industry
*	25.0	Urban Development
Indonesia	30.0	Agriculture
	52.5	Urban Development
	32.0	Transportation
	15.0	Development Finance Companies
	116.0	Power
	13.0	Population
	63.0	Agriculture
	35.0	Agriculture
	19.0	Education
	40.0	Development Finance Companies
	24.5	Population
Ivory Coast	30.0	Urban Development
	14.0	Urban Development
*	20.0	Agriculture
Jamaica	15.0	Agriculture
Kenya	10.0	Agriculture
	17.0	Tourism
	4.0	Transportation
	25.0	Agriculture
	5.0	Agriculture
	34.0	Agriculture
*	20.0	Development Finance Companies
Korea, Republic of	20.0	Agriculture
	67.0	Transportation

See footnotes at end of table.

TABLE E-1.—*IBRD loans approved by country and purpose, July 1, 1976 to June 30, 1977*—Continued

[Millions of dollars]

Country	Amount	Purpose
	80.0	Industry
*	29.0	Agriculture
*	75.0	Development Finance Companies
*	7.5	Development Finance Companies
*	95.0	Agriculture
*	70.0	Development Finance Companies
Liberia	6.3	Education
*	7.0	Development Finance Companies
Malawi	8.0	Power
*	9.0	Power
Malaysia	35.0	Education
	35.0	Transportation
	39.0	Agriculture
*	22.0	Power
Mauritius	3.6	Transportation
Mexico*	95.0	Industry
*	42.0	Tourism
*	120.0	Agriculture
Morocco	41.0	Agriculture
*	35.0	Agriculture
*	45.0	Industry
*	45.0	Development Finance Companies
Nicaragua*	22.0	Power
Nigeria	35.0	Agriculture
	27.0	Agriculture
Oman	15.0	Transportation
	1.5	Technical Assistance
Pakistan	10.0	Agriculture
	35.0	Transportation
*	25.0	Development Finance Companies
*	55.0	Industry
Panama*	8.0	Agriculture
*	7.5	Agriculture
*	42.0	Power
Papua New Guinea	12.0	Agriculture
Paraguay	8.0	Education
	10.0	Development Finance Companies
	22.0	Agriculture
Peru	25.0	Agriculture
*	35.0	Development Finance Companies
Philippines	95.0	Transportation
	15.0	Agriculture
	25.0	Education
	50.0	Agriculture
	23.0	Water Supply & Sewerage
	15.0	Agriculture
*	36.5	Agriculture
*	58.0	Power
Portugal	24.0	Transportation
*	50.0	Development Finance Companies
Romania*	60.0	Agriculture
*	38.0	Industry
*	50.0	Industry
*	18.3	Industry
Senegal	6.0	Transportation
	5.6	Tourism
	8.0	Tourism
*	4.2	Development Finance Companies
Spain	18.0	Industry
Sudan	12.0	Transportation
Swaziland	4.0	Agriculture
*	5.0	Development Finance Companies
Syrian Arab Republic	5.0	Agriculture
	12.5	Agriculture
	50.0	Water Supply & Sewerage
Tanzania	7.0	Agriculture
	30.0	Power
	15.0	Water Supply & Sewerage
	11.5	Industry
	11.5	Industry
Thailand	28.0	Agriculture
	55.0	Agriculture
*	25.0	Development Finance Companies
Tunisia	42.0	Agriculture
*	12.0	Agriculture
*	14.5	Power
*	21.0	Water Supply & Sewerage
Turkey	26.0	Tourism
*	70.0	Development Finance Companies
*	74.0	Development Finance Companies
Yugoslavia*	54.0	Agriculture
*	26.0	Agriculture
*	24.0	Agriculture
*	56.0	Transportation
*	80.0	Power
Zambia	30.0	Program Loan
	13.3	Education
	16.8	Agriculture
TOTAL	5,759.3	

*Guarantor.

Source: International Bank for Reconstruction and Development.

TABLE E–2.—*IBRD loan commitments and disbursements, by fiscal years through June 30, 1977*

[In millions of U.S. dollars]

Fiscal Year	Number of Loans	Loan Commitments	Disbursements
Total	1,453	39,159 [1]	22,689
1977	161	5,779	2,728
1976	141	5,047	2,535
1975	122	4,370	2,096
1974	105	3,328	1,608
1973	73	2,091	1,209
1972	72	2,026	1,202
1971	78	1,921	955
1970	69	1,680 [2]	772
1969	82	1,399	762
1968	44	847	772
1967	46	877	790
1966	37	839	668
1965	38	1,023	606
1964	37	810	559
1963	28	449	620
1962	29	882	485
1961	27	610	398
1947 to 1960	264	5,181	3,922

[1] Includes cancellations, refundings, and terminations totaling $1,049.4 million and loans approved but not yet effective totaling $4,139.3 million. Excludes Pakistan loans totaling $54.9 million consolidated into one loan to Bangladesh.

[2] A $100,000,000 Bank loan to IFC in 1966 was consolidated into a single loan of $200,000,000 in December 1969. The first $100,000,000 is included in fiscal year 1967. The Bank lent an additional $60,000,000 in fiscal year 1972, $40,000,000 in fiscal year 1973, $110,000,000 in fiscal year 1974, $50,000,000 in fiscal year 1975, $70,000,000 in fiscal year 1976, and $20,000,000 in fiscal year 1977.

NOTE.—Detail may not add to total due to rounding.

Source: International Bank for Reconstruction and Development.

TABLE E–3.—*IBRD statement of changes in financial position, fiscal year ended June 30, 1977*

[In millions of U.S. dollars]

FUNDS PROVIDED	
Operations:	
Net income	209
Items not requiring or providing cash:	
Accrued income on loans and investments	(58)
Accrued charges on borrowings and administrative expenses	108
Depreciation	1
Amortization of discounts, premiums and bond issuance expenses	13
Cash provided by operations	273
Borrowings	4,728
Adjustment of borrowings as a result of currency depreciations and appreciations	566
Repayments of loans to the Bank	709
Sales of loans	161
Capital subscriptions and maintenance of value adjustments	16
Decrease in amounts receivable for investment securities traded	4
Other	15
Total Funds Provided	6,472
FUNDS USED	
Disbursements on loans	2,728
Adjustments of loans outstanding as a result of currency depreciations and appreciations	453
Retirement of borrowings	1,463
Decrease (increase) in amounts payable for investment securities traded	199
Translation adjustments as a result of currency depreciations and appreciations during fiscal year	10
Payments on transfers to International Development Association	10
Other	55
Total Funds Used	4,918
INCREASE IN UNRESTRICTED CURRENCIES AND INVESTMENTS	1,554

NOTE.—Detail may not add to totals due to rounding.

Source: International Bank for Reconstruction and Development.

TABLE E–4.—*IBRD gross borrowings in fiscal year 1977*

[Expressed in millions of U.S. dollars]

Date	Type of Issue	New funds	Old funds	Totals
July 1	8 percent—5 Yr. Notes of 1976, due 1981	$ 250.0	$	$ 250.0
July 1	8⅝ percent—10 Yr. Notes of 1976, due 1986	250.0		250.0
July 1	8.85 percent—25 Yr. Bonds of 1976, due 2001	250.0		250.0
July 9	6½ percent—SwF Bonds of 1976, due 1991	39.9		39.9
July 28	8.10 percent—Notes of 1976, due 1980/84 (Yugoslavia)	100.0		100.0
Aug. 1	8 percent—DM Notes of 1976, due 1981		96.9	96.9
Aug. 1	8 percent—DM Notes of 1976, due 1982	58.1		58.1
Aug. 4	8¼ percent—Bonds of 1976, due 1984 (Saudi Arabia)	50.0		50.0
Mar. 22	8½ percent—Loan of 1976, due 1977–2001 (Third Window)	37.5		37.5
Sept. 15	6⅝ percent—2 Yr. Bonds of 1976, due 1978	150.0	200.0	350.0
Sept. 15	6⅛ percent—SwF Notes of 1976, due 1982 (First Issue)	141.3		141.3
Sept. 15	6⅛ percent—SwF Notes of 1976, due 1982 (Second Issue)	40.4		40.4
Sept. 23	8¼ Percent—Y Serial Obligations of 1976, due 1982/83 (Fourth Drawing)		7.0	7.0
Oct. 1	7¾ percent—DM Bonds of 1976, due 1983	99.0		99.0
Oct. 1	7¾ percent—DM Notes of 1976, due 1982	59.4		59.4
Oct. 1	8 percent—DM Loan of 1976, due 1984	159.4		159.4
Oct. 24	6 percent—DM Loan of 1976, due 1977		61.5	61.5
Dec. 1	8⅛ percent—DM Notes of 1976, due 1985	82.2		82.2
Dec. 1	7.80 percent—10 Yr. Notes of 1976, due 1986	310.0		310.0
Dec. 1	8⅝ percent—25 Yr. Bonds of 1976, due 2001	250.0		250.0
Dec. 1	6¾ percent—Notes of 1976, due 1983	82.7		82.7
Jan. 1	7 percent—DM Bonds of 1977, due 1987	104.3		104.3
Jan. 18	5.60 percent—DM Bonds of 1977, due 1978		85.1	85.1
Feb. 1	6¾ percent—DM Notes of 1977, due 1982		104.9	104.9
Feb. 1	5⅝ percent—SwF Notes of 1977, due 1982	80.6	120.9	201.5
Feb. 22	7⅝ percent—Notes of 1977, due 1985	40.0		40.0
Mar. 1	7¼ percent—DM Bonds of 1977, due 1985	41.7		41.7
Mar. 1	7 percent—DM Loan of 1977, due 1985	62.6		62.6
Mar. 2	5⅝ percent—SwF Notes of 1977, due 1984	39.7		39.7
Mar. 15	6.40 percent—2 Yr. Bonds of 1977, due 1979	60.0	240.0	300.0
Mar. 21	5¼ percent—SwF Bonds of 1977, due 1992	39.7		39.7
Apr. 28	5½ percent—SwF Bonds of 1977, due 1983	29.5		29.5
May 1	6½ percent—DM Bonds of 1977, due 1987	169.2		169.2
May 1	6½ percent—DM Bonds of 1977, due 1985	42.3		42.3
May 25	7.40 percent—DM Loan of 1977, due 1997	84.8		84.8
	Total FY 1977	3,204.3	916.3	4,120.6

Source: International Bank for Reconstruction and Development.

TABLE E-5.—*IBRD borrowings and outstanding issues as of June 30, 1977*

[In millions of U.S. dollars]

	Number of issues	Original amount	Outstanding amount	Outstanding issues
Total	328	29,507.9	18,477.5	182
U.S. dollars ...	119	16,215.7	9,172.9	50
Belgian francs.	4	93.0	75.4	3
Canadian dollars	9	198.1	129.4	6
Deutsche marks	95	6,946.6	4,493.5	54
French francs .	1	30.5	28.3	1
Italian lire	3	67.8	50.9	2
Japanese yen .	18	2,248.0	1,652.9	12
Kuwaiti dinars.	6	452.3	373.2	6
Lebanese pounds	1	24.4	24.4	1
Libyan dinars .	2	135.1	101.3	1
Netherlands guilders	14	420.6	335.2	11
Pounds sterling	4	51.6	8.9	1
Saudi Arabian riyals	1	141.6	141.6	1
Swedish kronor	2	34.1	33.5	2
Swiss francs ..	46	2,248.0	1,655.1	28
United Arab Emirates dirhams	1	77.0	77.0	1
Venezuelan bolivares ...	2	123.5	123.5	2

NOTE.—Detail may not add to totals due to rounding.
Source: International Bank for Reconstruction and Development.

READEX FICHE

TABLE E–6.—*Estimated Effects of IBRD Operations on United States Balance of Payments from Inception of IBRD through June 30, 1977*

[In millions of U.S. dollars]

	Inception through 6/30/69	IBRD Fiscal Year								Inception through 6/30/77
		1970	1971	1972	1973	1974	1975	1976	1977	
Received by IBRD from United States:										
1 percent subscription	**64**				**1**					**65**
9 percent subscription	**571**					**12**				**583**
Net IBRD bond sales	**1625**	**48**	**372**	**365**	**(40)**	**(50)**	**436**	**941**	**1462**	**5159**
Net IBRD loan sales	**181**	**(37)**	**(18)**	**(2)**	**(2)**	**(12)**	**(20)**	**(20)**	**(8)**	**62**
Investment income	**639**	**121**	**152**	**150**	**166**	**199**	**304**	**334**	**379**	**2444**
Total	**3080**	**132**	**506**	**513**	**125**	**149**	**720**	**1255**	**1833**	**8313**
Paid by IBRD to United States										
Procurement of goods [1]	**3197**	**157**	**211**	**214**	**186**	**203**	**293**	**322**	**342**	**5125**
Interest to loan holders	**150**	**9**	**7**	**7**	**5**	**6**	**5**	**5**	**4**	**198**
Interest to bond holders	**661**	**88**	**110**	**132**	**139**	**135**	**153**	**236**	**323**	**1977**
Administrative expenses (including net bond issuance costs)	**285**	**40**	**53**	**64**	**66**	**75**	**96**	**117**	**141**	**937**
Total	**4293**	**294**	**381**	**417**	**396**	**419**	**547**	**680**	**810**	**8237**
Net paid by IBRD to United States	**1213**	**162**	**(125)**	**(96)**	**271**	**270**	**(173)**	**(575)**	**(1023)**	**(76)**
Long-term investments [2]	**1084**	**414**	**82**	**512**	**2**	**186**	**(1353)**	**(274)**	**987**	**1640**
Net paid by IBRD to United States and long-term investments	**2297**	**576**	**(43)**	**416**	**273**	**456**	**(1526)**	**(849)**	**(36)**	**1564**

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[1] **Includes procurement specifically identified as originating in the United States and the same proportion of procurement not identifiable by country of origin.**

[2] **Maturities over one year.**

Source: **International Bank for Reconstruction and Development.**

SECTION F.—International Development Association

TABLE F-1.—*IDA credits approved, by country and purpose, July 1, 1976 to June 30, 1977*

[Millions of dollars]

Country	Amount	Purpose
Afghanistan	6.0	Education
	12.0	Agriculture
Bangladesh	50.0	Program Credit
	21.0	Agriculture
	16.0	Agriculture
	10.0	Agriculture
	25.0	Program Credit
Benin, People's Republic of	1.7	Technical Assistance
	5.5	Transportation
Burma	10.0	Transportation
	16.0	Industry
Burundi	10.0	Education
Cameroon	10.0	Transportation
	4.5	Technical Assistance
	2.0	Agriculture
	7.0	Agriculture
Chad	8.0	Agriculture
	12.0	Agriculture
Congo, People's Republic of the	.5	Education
Egypt, Arab Republic of	25.0	Education
	27.0	Agriculture
El Salvador	6.0	Urban Development
Ethiopia	25.0	Agriculture
	32.0	Transportation
Ghana	9.0	Power
Haiti	10.0	Agriculture
Honduras	5.0	Transportation
India	30.0	Agriculture
	20.0	Agriculture
	150.0	Power
	24.0	Urban Development
	12.0	Agriculture
	4.0	Agriculture
	10.0	Agriculture
	200.0	Agriculture
	23.0	Agriculture
	8.0	Agriculture
Kenya	10.0	Agriculture
	4.0	Transportation
	20.0	Agriculture
	6.0	Agriculture
Lesotho	2.5	Development Finance Companies
Liberia	7.0	Agriculture
Madagascar	14.0	Education
Malawi	8.0	Power
	7.0	Water Supply & Sewerage
Mali	15.5	Agriculture
	10.5	Transportation
Mauritania	2.7	Technical Assistance
	3.5	Technical Assistance
Nepal	9.0	Agriculture
	3.0	Technical Assistance
	8.0	Water Supply & Sewerage
	4.0	Water Supply & Sewerage
	4.0	Development Finance Companies
Pakistan	15.0	Education
	25.0	Transportation
	40.0	Agriculture
Papua New Guinea	4.0	Education
	19.0	Transportation
Paraguay	4.0	Education
Rwanda	1.8	Agriculture
	4.0	Development Finance Companies
	14.0	Agriculture
Somalia	5.0	Development Finance Companies
	7.0	Transportation
Sri Lanka	5.0	Agriculture
	19.0	Agriculture
	9.2	Water Supply & Sewerage
Sudan	17.0	Agriculture
	8.0	Transportation
Tanzania	9.0	Agriculture
	8.0	Agriculture
	15.0	Program Credit
	7.2	Agriculture
Togo	10.0	Transportation
Tunisia	4.8	Population
Upper Volta	20.0	Transportation
	3.6	Agriculture
Yemen Arab Republic	5.0	Agriculture
	10.0	Water Supply & Sewerage
	6.0	Transportation
Zaire	8.0	Agriculture
	8.0	Agriculture
	10.0	Development Finance Companies
Total	1,307.5	

Source: International Development Association.

TABLE F-2.—*IDA credit commitments and disbursements by fiscal years, through June 30, 1977*

[Millions of dollar equivalents]

Fiscal Year	Number of credits	Credit commitments *	Disbursements
Total	666	11,397	7,011
1977	67	1,308	1,293
1976	73	1,655	1,252
1975	68	1,576	1,025
1974	69	1,095	711
1973	75	1,357	493
1972	68	1,000	261
1971	51	584	235
1970	50	606	143
1969	29	385	256
1968	16	107	319
1967	17	354	342
1966	12	284	267
1965	19	309	222
1964	17	283	124
1963	17	260	56
1962	16	134	12
1961	2	101	....

* Includes cancellations, refundings and terminations totaling $98,674,111 and credits approved but not yet effective totaling $757,000,000.

NOTES.—This table does not include the Bangladesh resumption credits in the total amounts of lending, numbers of operations, and cancellations. Detail may not add to totals due to rounding.

Source: International Development Association.

TABLE F-3.—*Funds available for lending by IDA as of June 30, 1977*

[Millions of dollar equivalents]

Part I countries (100 percent of subscriptions)	910
Part II countries (10 percent of subscriptions)	33
Part II countries (90 percent portion released)	44
Additional subscriptions part I countries	63
Additional subscriptions part II countries	2
Total, subscriptions	1,052
1st replenishment	898
2nd replenishment	1,433
Special supplementary contributions	86
3rd replenishment	2,870
4th replenishment *	4,124
Total, supplementary resources	9,411
Loans from Swiss Confederation	74
World Bank transfers	1,099
Accumulated net income	75
Participation in credits	23
Grand Total	11,734
Less net commitments	11,729
Funds available for lending as of June 30, 1977	5

*Excluding Swiss loan not received by IDA.

Source: International Development Association.

TABLE F-4.—*Estimated IDA Effects on United States Balance of Payments from Inception of IDA through June 30, 1977*

[U.S. dollars—millions]

	Inception through 6/30/69	IDA Fiscal Year								Inception through 6/30/77
		1970	1971	1972	1973	1974	1975	1976	1977	
Received by IDA from United States:										
Subscriptions and contributions	528.7	54.6	37.7	78.1	125.1	230.2	340.6	489.8	773.5	2,658.3
Investment income	21.5	5.5	7.3	9.9	11.8	25.9	26.2	14.1	9.0	131.2
Total	550.2	60.1	45.0	88.0	136.9	256.1	366.8	503.9	782.5	2,789.5
Paid by IDA to United States:										
Procurement of goods [1]	266.0	19.4	45.7	35.1	59.8	87.7	122.6	158.7	116.2	911.2
Administrative expenses	22.4	14.3	18.4	27.5	27.3	39.9	43.7	60.0	68.8	322.3
Total	288.4	33.7	64.1	62.6	87.1	127.6	166.3	218.7	185.0	1,238.5
Net received by IDA from United States	261.8	26.4	(19.1)	25.4	49.8	128.5	200.5	285.2	597.5	1,556.0
Long-term investments [2]	10.0	(10.0)	...	...	...	142.0	(122.0)	(10.0)	6.5	16.5
Net received by IDA from United States	251.8	36.4	(19.1)	25.4	49.8	(13.5)	322.5	295.2	591.0	1,539.5

[1] Includes procurement specifically identifiable as originating in the United States and the same proportion of procurement not identifiable by country of origin.

[2] Maturities over one year.

Source: International Development Association.

SECTION G.—International Finance Corporation

TABLE G-1.—*IFC investment commitments July 1, 1976 to June 30, 1977*

[Millions of dollars]

Country	Total	Loan	Equity	Purpose
Total	258.9	241.8	17.1	
Argentina	7.0	7.0		Textiles
	9.0	9.0		Food and Food Processing
Brazil	10.9	9.9	1.0	Iron and Steel
	20.0	20.0		Manufacturing
	15.0	15.0		Mining
Cameroon	.8		.8	Food and Food Processing
Colombia	15.0	13.0	2.0	Public Utilities
	2.4	2.4		Construction Materials
Cyprus	.6	.5	.1	Construction Materials
Ecuador	.1		.1	DFC
Greece	.1		.1	Food and Food Processing
	40.0	40.0		DFC
Guatemala	3.0	3.0		Construction Materials
Indonesia	.4	.4		Textiles
	1.5	1.4	.1	Textiles
Ivory Coast	.9		.9	Textiles
Kenya	2.0	2.0		Capital Markets
	1.8	1.2	.6	Pulp and Paper
Korea	.2		.2	Manufacturing
	.3		.3	DFC
	.5		.5	Capital Markets
	15.4	15.0	.4	Capital Markets
Liberia	.3		.3	DFC
Madagascar	11.3	11.0	.3	Textiles
Malawi	9.0	9.0		Food and Food Processing
Morocco	7.1	4.8	2.3	Construction Materials
Philippines	.3		.3	Petrochemicals
	3.5	2.3	1.2	Mining
	3.5	3.5		Manufacturing
Thailand	.3		.3	Capital Markets
	2.7	2.5	.2	Food and Food Processing
Turkey	.2		.2	Iron and Steel
Yugoslavia	6.0	4.0	2.0	Food and Food Processing
	15.5	13.3	2.2	Pulp and Paper

NOTE.—Individual items may not add to total because of rounding.

Source: International Finance Corporation.

TABLE G-2.—*IFC statement of changes in financial position for fiscal year 1977*

[Expressed in U.S. dollars]

Source of resources:	
Net income	8,896,564
Items not requiring current outlay of funds:	
Provisions for losses on investments	5,948,001
Changes in accrued income and expenses	1,721,550
Other	(171,860)
	16,394,255
Capital subscriptions	18,000
Loans from the International Bank for Reconstruction and Development	127,440,813
Repayments of loans	38,644,755
Sales and participations	75,642,168
Other	
Total source of resources	258,139,991
Application of resources:	
Disbursements on loans and equity investments	259,937,771
Repayments on loans from the International Bank for Reconstruction and Development	11,806,038
Other	1,047,294
Total application of resources	272,791,103
Increase (Decrease) in cash and short-term obligations of governments	(14,651,112)

Source: International Finance Corporation.

TABLE G-3.—*Summary of IFC investments and standby and underwriting commitments as of June 30, 1977*

[Thousands of dollars]

Area, country	No. of investments and standby and underwriting commitments	Operational investments	Standby and underwriting commitments	Total commitments
Australia				
Australia	3	975.0		975.0
Africa and Middle East				
Cameroon	2	934.8	252.7	1,187.5
Egypt	1	5,651.7		5,651.7
Ethiopia	5	12,052.4	3,715.5	15,767.9
Iran	8	42,535.6		42,535.6
Israel	2	10,500.0		10,500.0
Ivory Coast	2	1,088.8		1,088.8
Jordan	2	4,910.2		4,910.2
Kenya	9	38,777.3		38,777.3
Lebanon	4	7,280.0		7,280.0
Liberia	2	306.3	250.0	556.3
Madagascar	1	11,292.7		11,292.7
Malawi	2	15,000.0		15,000.0
Mauritania	1	20,006.5		20,006.5
Mauritius	1	614.9		614.9
Morocco	4	11,310.9		11,310.9
Nigeria	7	4,595.8	1,400.0	5,995.8
Rwanda	1	535.0		535.0
Senegal	5	4,541.4		4,541.4
Sudan	3	12,192.0		12,192.0
Tanzania	2	4,657.5		4,657.5
Tunisia	8	20,687.4		20,687.4
Uganda	2	4,618.4		4,618.4
Zaire	1	756.3		756.3
Zambia	4	3,808.1		3,808.1
Africa (Regional)	2	680.0		680.0
	81	239,234.0	5,618.2	244,952.2
Asia				
Afghanistan	1	321.6		321.6
China	3	9,843.8		9,843.8
India	15	58,403.0		58,403.0
Indonesia	15	61,322.0		61,322.0
Korea	19	113,557.3		113,557.3
Malaysia	6	8,200.7	490.0	8,690.7
Nepal	1	3,107.0		3,107.0
Pakistan	13	30,224.1		30,224.1
Philippines	18	77,996.7	8,255.7	86,252.4
Sri Lanka	1	3,250.0		3,250.0
Thailand	7	35,760.2		35,760.2
	99	401,986.4	8,745.7	410,732.1
Europe				
Cyprus	2	3,554.4		3,554.4
Finland	4	2,989.0	158.6	3,147.6
Greece	10	56,235.8		56,235.8
Italy	1	960.0		960.0
Spain	7	18,760.6		18,760.6
Turkey	26	158,385.6		158,385.6
Yugoslavia	12	151,065.8		151,065.8
	62	391,951.2	158.6	392,109.8

See footnote at end of table.

TABLE G-3.—*Summary of IFC investments and standby and underwriting commitments as of June 30, 1977*—Continued

[Thousands of dollars]

Area, country	No. of investments and standby and underwriting commitments	Operational investments	Standby and underwriting commitments	Total commitments
Western Hemisphere				
Argentina	12	66,210.0	3,000.0	69,210.0
Bolivia	3	1,187.5	100.0	1,287.5
Brazil	32	321,405.8	878.6	322,284.4
Chile	10	21,191.3	....	21,191.3
Colombia	45	53,192.0	466.5	53,658.5
Costa Rica	2	278.8	310.8	589.6
Dominican Republic	1	7,380.0	....	7,380.0
Ecuador	7	9,376.4	....	9,376.4
El Salvador	2	1,073.6	....	1,073.6
Guatemala	3	18,200.0	....	18,200.0
Honduras	4	452.5	....	452.5
Jamaica	2	3,137.0	....	3,137.0
Mexico	20	46,551.4	22,539.3	69,090.7
Nicaragua	3	9,471.4	....	9,471.4
Panama	1	1,472.5	....	1,472.5
Paraguay	1	5,400.0	....	5,400.0
Peru	10	23,979.9	....	23,979.9
Uruguay	1	3,800.0	....	3,800.0
Venezuela	13	18,528.8	13,592.1	32,120.9
Latin America (Regional)	1	10,000.0	....	10,000.0
	173	622,288.9	40,887.3	663,176.2
Totals	418	1,656,535.5	55,409.8	1,711,945.3

Source: International Finance Corporation.

SECTION H.—Inter-American Development Bank

TABLE H-1.—*IDB Fund for Special Operations, contribution quotas*[1]*, June 30, 1977*

[Thousands of U.S. dollars]

Country	Contribution quotas
Argentina	306,819
Austria	5,055
Barbados	1,103
Belgium	12,498
Bolivia	24,635
Brazil	306,819
Canada[2]	113,870
Chile	84,240
Colombia	84,185
Costa Rica	12,315
Denmark	5,392
Dominican Republic	16,421
Ecuador	16,421
El Salvador	12,315
Finland	5,055
France	61,596
Germany	63,092
Guatemala	16,421
Guyana	5,280
Haiti	12,315
Honduras	12,315
Israel	4,994
Italy	61,596
Jamaica	16,421
Japan	68,725
Mexico	197,249
Netherlands	9,361
Nicaragua	12,315
Panama	12,315
Paraguay	12,315
Peru	41,092
Spain	61,596
Switzerland	13,752
Trinidad and Tobago	12,315
United Kingdom	61,596
United States[3]	3,400,000
Uruguay	32,902
Venezuela	180,060
Yugoslavia	5,055
Total	5,381,821

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[1] Excluding maintenance of value adjustments of $504,623,000 resulting from currency revaluations.

[2] Canada will also contribute the repayments of loans made from a fund administered by IDB totaling $74,000,000. At June 30, 1977, $3,870,000 had been contributed.

[3] A portion of the U.S. contribution is pending appropriation by the U.S. Congress.

Source: Inter-American Development Bank.

TABLE H-2.—*IDB loan approvals—Ordinary Capital and Inter-Regional Capital resources, by country, purpose and terms, July 1, 1976 to June 30, 1977* [1]

Borrowing country—purpose	Amount (millions)	Interest (percent)	Maturity [2] (years)
Ordinary Capital			
Total	$521.1		
Argentina:			
Transport	87.0	8.6	20
Agriculture	60.0	8.6	20
Industry	51.0	8.6	15
Industry	32.0	Variable	7
Brazil:			
Agriculture	34.4	8.60	20
Education	40.0	8.60	20
Chile:			
Industry	21.0	8.6	20
Export Credit	1.5	7.0	Variable
Ecuador:			
Transport	20.0	8.6	15
Electric power	25.0	8.6	20
Honduras:			
Export Credit	.5	7.0	....
Mexico:			
Education	20.0	8.35	20
Agriculture	54.0	8.35	20
Preinvestment	5.0	8.35	20
Nicaragua:			
Agriculture	3.0	8.60	25
Panama:			
Industry	2.0	8.60	20
Transport	22.0	8.60	20
Tourism	24.0	8.35	20
Peru:			
Export Credit	3.7	7.0	Variable
Uruguay:			
Industry	15.0	8.60	15
Inter-Regional Capital			
Total	$141.1		
Brazil:			
Electric Power	97.7	8.60	20
Peru:			
Industry	33.4	8.60	15
Preinvestment	2.0	8.60	20
Jamaica:			
Industry	8.0	8.60	20

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[1] Excludes loans which were both approved and cancelled during the period. Also excludes increases to loans originating through repayments received under revolving lines of credit.

[2] Starting with the date of contract signature.

Source: Inter-American Development Bank.

TABLE H-3.—*IDB loan approvals—Fund for Special Operations, by country, purpose and terms, July 1, 1976 to June 30, 1977*

Borrowing country—purpose	Amount (millions)	Interest (percent)	Maturity[2] (years)
Total	$584.3	....	
Bolivia:			
Preinvestment ..	5.0	1.00–2.00[1]	25
Housing	6.5	1.00–2.00[1]	40
Brazil:			
Agriculture	32.0	3.00	25
Education	20.0	3.00	30
Chile:			
Agriculture	38.0	2.00	30
Water and Sewerage	7.5	2.00	30
Colombia:			
Agriculture	64.0	2.00	30
Water and Sewerage	16.0	2.00	30
Transport	29.0	2.00	30
Costa Rica:			
Water and Sewerage	15.5	2.00	35
Preinvestment ..	8.1	2.00	30
Education	4.8	2.00	35
Agriculture	10.0	2.00	20
Dominican Republic:			
Education	3.9	1.00–2.00[1]	40
Agriculture	19.5	1.00–2.00[1]	40
Ecuador:			
Agriculture	11.0	1.00–2.00[1]	40
Preinvestment ..	1.6	1.00–2.00[1]	20
El Salvador:			
Transport	10.0	1.00–2.00[1]	40
Agriculture	5.3	1.00–2.00[1]	40
Water and Sewerage	4.7	1.00–2.00[1]	40
Guatemala:			
Transport	25.0	1.00–2.00[1]	40
Haiti:			
Agriculture	5.0	1.00–2.00[1]	40
Honduras:			
Water and Sewerage	12.0	1.00–2.00[1]	40
Agriculture	40.0	1.00–2.00[1]	40
Education	3.0	1.00–2.00[1]	40
Industry	59.5	1.00–2.00[1]	40
Mexico:			
Preinvestment ..	10.0	4.00	20
Nicaragua:			
Water and Sewerage	16.8	1.00–2.00[1]	40
Agriculture	12.0	1.00–2.00[1]	40
Transport	18.0	1.00–2.00[1]	40
Panama:			
Industry	$3.0	2.00	24
Paraguay:			
Water and Sewerage	11.6	1.00–2.00[1]	40
Peru:			
Preinvestment ..	8.0	2.00	20
Agriculture	30.0	2.00	30
Barbados:			
Education	7.4	2.00	35
Jamaica:			
Preinvestment ..	2.6	2.00	25
Regional:			
Preinvestment ..	8.0	1.00–2.00[1]	30

See footnotes at end of table.

TABLE H-3.—*IDB loan approvals—Fund for Special Operations, by country, purpose and terms, July 1, 1976 to June 30, 1977*—Continued

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[1] The first interest rate shown is applicable during the grace period and the second is applicable thereafter.

[2] Starting with the date of contract signature.

Source: Inter-American Development Bank.

TABLE H-4.—*IDB loan commitments, disbursements, and undisbursed amounts for Ordinary Capital, Inter-Regional Capital and the Fund for Special Operations, through Dec. 31, 1976*

[Millions of U.S. dollars]

Calendar year	Number of loans	Commitments	Disbursements	Undisbursed accumulated
Total	804	9,445.3	5,200.8	....
1976	68	1,414.6	748.0	4,244.5
1975	62	1,256.4	671.5	3,577.9
1974	51	1,084.4	659.7	2,993.0
1973	50	860.3	570.5	2,568.3
1972	48	771.2	464.6	2,278.5
1971	50	521.4	450.1	1,971.9
1961–70	475	3,537.0	1,636.4	1,900.6

NOTE.—Commitments have been adjusted for cancellations and currency exchange rate fluctuations in the years in which the corresponding loans were approved; disbursements have been adjusted for currency exchange rate fluctuations in the years in which such adjustments were recorded. Such adjustments also affect cumulative undisbursed amounts.

Source: Inter-American Development Bank.

TABLE H-5.—*Estimated Effects of IDB Ordinary Capital Transactions on the U.S. Balance of Payments, 1960–1976*

[Millions of dollars]

	Calendar Year																	From inception to 12–31–76
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	
1. U.S. subscription[1]	30.0	60.0	(15.0)	....	....	....	37.5	37.5	....	....	....	....	....	....	29.0	34.8	39.3	253.1
2. Net sales of bonds and loan participations in United States	.....	.9	76.9	2.7	135.2	(.7)	3.1	86.8	73.6	(5.1)	79.5	(13.7)	(16.0)	(21.2)	(4.9)	204.8	225.0	826.9
3. Investment income earned by IDB in United States	.3	1.5	4.6	7.5	8.3	11.6	14.8	18.1	21.3	29.1	34.6	28.8	24.3	36.5	45.1	49.5	57.3	393.7
4. U.S. Payments to IDB	30.8	62.4	66.5	10.2	143.5	10.9	55.4	142.4	94.9	24.0	114.1	15.1	8.3	15.3	69.2	289.1	321.6	1,473.7
5. IDB-financed goods bought in United States[2]	.....	.5	5.7	19.7	12.4	24.6	19.0	22.4	43.0	20.6	33.6	24.6	28.6	33.2	33.6	60.9	64.6	447.0
6. Interest paid by IDB to U.S. bondholders and purchasers of participations	.....	.....	.1	3.4	4.6	10.0	10.6	11.9	15.5	19.9	19.3	27.1	27.1	23.3	29.5	39.6	52.9	294.8
7. IDB administrative expenses in United States[2] [3]	.7	1.9	2.7	3.9	9.8	8.2	8.5	9.3	8.0	8.4	9.6	10.6	11.0	15.0	20.4	22.0	23.5	173.5
8. U.S. receipts from IDB (items 5 through 7)	.7	2.4	8.5	27.0	26.8	42.8	38.1	43.6	66.5	48.9	62.5	62.3	66.7	71.5	83.5	122.5	141.0	915.3

See footnotes at end of table.

TABLE H-5.—*Estimated Effects of IDB Ordinary Capital Transactions on the U.S. Balance of Payments, 1960–1976*—Continued

[Millions of dollars]

	Calendar Year																	From inception to 12–31–76
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	
9. Net U.S. payments to (receipts from) IDB	30.1	60.0	58.0	(16.8)	116.7	(31.9)	17.3	98.8	28.4	(24.9)	51.6	(47.2)	(58.4)	(56.2)	(14.3)	166.6	180.6	558.4
10. Long-term investments [4] ...	......	......	17.0	38.5	63.5	(18.0)	81.0	105.6	(50.0)	(38.4)	(2.2)	(224.0)	(4.5)	196.8	139.7	(121.1)	356.6	461.1
11. Net U.S. payments to (receipts from) IDB after long-term investments in the United States ...	30.1	60.0	41.0	(55.3)	53.2	(13.9)	(63.7)	(6.8)	(21.6)	13.5	53.8	176.8	(53.9)	(253.0)	25.4	287.7	(176.0)	97.3
12. Short-term investments [5] ..	52.8	103.7	50.5	(75.9)	12.5	(22.9)	(27.5)	(16.8)	(20.6)	8.8	58.9	205.3	(6.7)	(124.6)	(7.5)	296.8 [6]	(49.6)	437.2
13. Net U.S. payments to (receipts from) IDB after investments in the United States ...	(22.7)	(43.7)	(9.5)	20.6	40.7	9.0	(36.2)	10.0	(1.0)	4.7	(5.1)	(28.5)	(47.2)	(128.4)	32.9	(9.1)	(126.4)	(339.9)

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[1] Total U.S. subscriptions net of amounts held by IDB in non-negotiable, non-interest bearing notes received from the U.S. on account of its own subscription.

[2] Partly estimated.

[3] Includes payment for real estate and mortgage amortization.

[4] Net changes in IDB holdings of U.S. dollars invested in the United States with maturities of more than 12 months.

[5] Net changes in IDB holdings of U.S. dollars invested in the United States, excluding those with maturities of more than 12 months.

[6] Includes $71 million of Special Reserve investments at 12/31/75.

Source: Inter-American Development Bank.

Table H–6.—*Estimated effects of IDB Fund for Special Operations transactions on the U.S. balance of payments, 1960 to December 31, 1976*

[Millions of dollars]

1. U.S. subscription		
Total subscription	3,640.3	
Less: Amount not yet received in cash	2,017.9	1,622.4
2. Investment income earned by IDB in United States		22.6
3. U.S. Payments to IDB *		1,645.0
4. IDB-financed goods bought in United States via direct purchases		433.6
5. IDB-financed goods bought in United States via Special Letters of Credit		561.1
6. Interest paid by IDB to U.S. purchasers of participations		.2
7. IDB administrative and technical assistance expenses in United States		193.8
8. U.S. receipts from IDB (items 4 through 7)		1,188.7
9. Net U.S. payments to IDB		456.3
10. Long-term investments		24.0
11. U.S. Payments to IDB, net of long-term investments in the United States		432.3
12. Short-term investments		23.5
13. Net U.S. payments to IDB after investments in the United States		408.8

*Excludes $33.7 million of dollar participations in loans of the Fund for Special Operations sold to the Social Progress Trust Fund.

Source: Inter-American Development Bank.

Table H–7.—*IDB borrowings and outstanding issues as of June 30, 1977*

[Millions of U.S. dollar equivalents]

[IDB exchange rates as of June 30, 1977]

Currency of issue	Number of issues	Original amount	Outstanding amount	Outstanding issues
Total	107	2,564.5	2,177.4	91
U.S. dollars	47	1,350.0*	1,167.7	34
Austrian schillings	4	44.9	32.9	4
Belgian francs	2	19.6	14.2	2
British pounds	4	15.0	6.6	3
French francs	2	40.5	37.3	2
German marks	12	417.0	327.6	11
Italian lire	3	51.4	43.4	3
Japanese yen	13	199.3	158.1	13
Netherland guilders	2	27.0	25.6	2
Spanish pesetas	1	11.7	11.7	1
Swedish kronors	4	23.9	18.7	4
Swiss francs	11	336.7	306.1	10
Trinidad and Tobago dollars	1	4.2	4.2	1
Venezuelan bolivares	1	23.3	23.3	1

*Only net increases considered in rollover of short-term borrowings.

Source: Inter-American Development Bank.

TABLE H-8.—*IDB gross borrowings, July 1, 1976 to June 30, 1977*

[Millions of U.S. dollar equivalents]

[IDB exchange rates as of June 30, 1977]

Date	Type of issue	Total	New Funds	Old Funds
Total		447.2	393.1	54.1
1976:				
July 1	8.25 percent DM Bonds of 1976–83	21.3	21.3	
July 15	8.75 percent US$ Bonds of 1976–2001	100.0	100.0	
August 1	8.25 percent US$ Bonds from Trinidad & Tobago	15.0	15.0	
October 25	6.25 percent Swiss Franc Notes of 1976–83	61.2	61.2	
December 15	6 percent Finnish Loan—Ninth Issue	.1	.1	
December 16	7 percent DM Bonds of 1977–87	42.6	42.6	
December 17	8 percent Austrian Schilling Bonds of 1976–86	18.0	18.0	
1977:				
January 5	7.75 percent Italian Government Loan of 1977–87	15.0	15.0	
April 15	6.5 percent Short-Term Dollar Bonds*—12th Issue	74.0	19.9	54.1
June 1	8.375 percent US$ Bonds of 1977–2002	100.0	100.0	

*This bond issue was placed with central banks and governmental agencies of Latin American member countries.

Source: Inter-American Development Bank.

SECTION I.—Asian Development Bank

Table I-1.—*Status of contributions to ADB Special Funds as of June 30, 1977*

[Thousands of dollars] *

Contributors	Amounts committed	Amounts made available	Amounts drawn	Resources available for drawing
Multi-purpose special fund:				
Canada	7,699	7,699	7,699	
Technical assistance special fund:				
Australia	966	966	966	
Austria	124	124	124	
Bangladesh	24	24	24	
Belgium	675	675	302	373
Canada	1,645	1,645	1,645	
China, Republic of	200	200	200	
Denmark	881	881	881	
Finland	117	117	117	
Germany, Federal Republic of	480	480	480	
India	493	493	218	275
Italy	141	141	141	
Japan	15,524	15,524	15,524	
Korea, Republic of	180	180	130	50
Netherlands	571	571	561	10
New Zealand	331	331	192	139
Norway	100	100	100	
Pakistan	185	185	178	7
Sri Lanka	20	20	20	
Switzerland	603	603	603	
United Kingdom	1,006	1,006	961	45
United States	1,250	1,250	1,250	
Total	25,516	25,516	24,617	899

*Amounts are expressed in the U.S. dollar conversion rate adopted by the Bank as of June 30, 1977.

Source: Asian Development Bank.

TABLE I-2.—*Status of contributions to ADB Asian Development Fund as of June 30, 1977*

[Thousands of dollars] [1]

Contributors	Amounts committed [2]	Amounts made available	Amounts drawn	Resources available for drawing
Contributed Resources:				
Australia	52,812	52,812	41,385	11,427
Austria	4,522	4,522	2,261	2,261
Belgium	12,313	12,313	9,969	2,344
Canada	77,193	77,193	52,308	24,885
Denmark	10,391	10,391	8,406	1,935
Finland	3,424	3,424	3,424	....
Germany, Federal Republic of	98,099	98,099	80,715	17,384
Italy	28,471	28,471	21,173	7,298
Japan	543,938	543,938	446,922	97,016
Netherlands	27,483	27,483	23,292	4,191
New Zealand	8,668	8,668	4,711	3,957
Norway	7,922	7,922	6,042	1,880
Sweden	6,330	6,330	....	6,330
Switzerland	13,829	13,829	10,976	2,853
United Kingdom	50,977	50,977	40,260	10,717
United States	150,000	150,000	125,000	25,000
Total	1,096,372	1,096,372	876,844	219,528
Set-Aside Resources	57,434	57,434	57,434	....
Other Resources	3,613	3,613	3,613	....
Grand Total	1,157,419	1,157,419	937,891	219,528

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[1] Amounts are expressed in the U.S. dollar conversion rate adopted by the Bank as of June 30, 1977.

[2] Including amounts transferred from the Multi-Purpose Special Fund.

Source: Asian Development Bank.

TABLE I-3.—*Asian Development Bank, Ordinary Capital resources, loans approved July 1, 1976 to June 30, 1977*

[Millions of dollars]

Country, borrower	Project	Amount	Terms[1] (Years)	Interest (Percent)
Total		288.94		
Hong Kong:				
Government of Hong Kong	Sha Tin Urban Development (Housing) Project	20.50	18(3)	$8\frac{7}{10}$
Indonesia:				
Republic of Indonesia	Bandung Urban Development and Sanitation Project	1.15	10(2)	$9\frac{1}{10}$
Do	South East Sulawesi Transmigration Sanitation Project	0.28	10(2)	$9\frac{1}{10}$
Do	Second Road Project (Surabaya-Malang Highway)	48.21	25(5)	$8\frac{9}{10}$
Korea, Republic of:				
Republic of Korea	Namgang Area Development Project	32.00	27(7)	$9\frac{1}{10}$
Medium Industry Bank	Fourth Medium Industry Bank Project	30.00	15(3)	$8\frac{9}{10}$
Malaysia:				
Malaysia	Fisheries Development Project	27.00	18(5)	$9\frac{1}{10}$
Do	Johore and Kelantan Water Supply Project	15.00	20(5)	$8\frac{9}{10}$
Do	Second Penang Port Expansion Project	10.00	20(4)	$8\frac{7}{10}$
Pakistan:				
Islamic Republic of Pakistan	Port Qasim Project[2]	37.80	25(5)	$8\frac{9}{10}$
Philippines:				
Republic of the Philippines	Second Davao del Norte Irrigation	15.00	30(7)	$8\frac{9}{10}$
National Power Corporation	Fourth Mindanao Power Project	52.00	25(5)	$8\frac{9}{10}$

[1] Inclusive of grace period (shown in parenthesis).

[2] Listed in loans from Special Funds as well as from Ordinary Capital.

Source: Asian Development Bank.

TABLE I–4.—*Asian Development Bank Special Funds resources, loans approved July 1, 1976 to June 30, 1977*

[Millions of dollars]

Country, borrower	Project	Amount	Terms[1] (Years)	Service Charge (Percent)
Total		203.26		
Afghanistan:				
Kingdom of Afghanistan	Seeds Project	14.00	40(10)	1
Bangladesh:				
People's Republic of Bangladesh	Chittagong Urea Fertilizer Technical Services Project	2.50	10(2)	1
Do	Second Bangladesh Shilpa Rin Sangstha Project	25.00	40(10)	1
Do	Serajgong Integrated Rural Development Project	26.00	40(10)	1
Do	Khulne-Mongla Road Project	15.00	40(10)	1
Burma:				
Socialist Republic of the Union of Burma	Forestry Project	25.10	40(10)	1
Gilbert Islands:				
Government of the Gilbert Islands	Causeway Project	1.75	40(10)	1
Nepal:				
Kingdom of Nepal	Hetauda-Narayangarh Road Project (Supplementary)	4.80	40(10)	1
Do	Hetauda Cement Project	39.50	40(10)	1
Do	Agricultural Credit Project (Third)	6.00	40(10)	1
Pakistan:				
Islamic Republic of Pakistan	Port Qasim Project[2]	10.30	40(10)	1
Papua New Guinea:				
Independent State of Papua New Guinea	Water Supply Project	13.50	40(10)	1
Do	East Sepik Rural Development Project	7.74	40(10)	1
Solomon Islands:				
Government of the Solomon Islands	Beef Cattle Development Project	3.57	40(10)	1
Sri Lanka:				
Republic of Sri Lanka	Development Finance Corporation of Ceylon Project	5.00	40(10)	1
Western Samoa:				
Independent State of Western Samoa	Development Bank of Western Samoa Project (Second)	3.00	40(10)	1

[1] Inclusive of grace period (shown in parenthesis).

[2] Listed in loans from Ordinary Capital as well as from Special Funds.

Source: Asian Development Bank.

TABLE I-5.—*ADB—Ordinary Capital resources—loan commitments, disbursements and undisbursed balances from inception through calendar year 1976*

[Millions of dollars]

Calendar year	Number of loans[1]	Loans		Undisbursed (cumulative)
		Commitments[2]	Disbursements[3]	
Total ...	171	2,288	948	
1976	20	444	264	1,340
1975	25	451	285	1,160
1974	27	476	160	994
1973	24	192	120	678
1972	16	200	51	606
1971	17	220	43	457
1970	22	197	16	280
1969	13	66	7	99
1968	7	42	2	40

[1] Excludes loans approved and unsigned.

[2] Net of cancellations but includes loans signed but not yet effective and loans sold or agreed to be sold.

[3] Excludes adjustment in U.S. Dollar equivalents of loans disbursed but includes repayment of loans sold.

Source: Asian Development Bank.

TABLE I-6.—*ADB—Special Funds resources—loan commitments, disbursements and undisbursed balances from inception through calendar year 1976*[1]

[Thousands of dollars]

Calendar year	Number of loans[2]	Loans		Undisbursed (cumulative)
		Commitments[3]	Disbursements[4]	
Total ..	113	875,885	211,196	
1976	13	219,095	63,252	664,689
1975	15	192,851	76,993	508,846
1974	20	158,326	27,213	392,988
1973	21	104,065	26,188	261,875
1972	16	94,340	10,755	183,998
1971	12	51,510	5,250	100,413
1970	11	39,703	1,470	54,153
1969	5	15,995	75	15,920

[1] Including the Asian Development Fund.

[2] Excludes loans approved and unsigned.

[3] Net of cancellations but includes loans signed but not yet effective.

[4] Excludes adjustment in U.S. Dollar equivalents of loans disbursed but includes repayment of loans.

Source: Asian Development Bank.

TABLE I-7.—*Asian Development Bank—Ordinary Capital resources—estimated effect of operations on the U.S. balance of payments from inception of ADB through calendar year 1976*

[In millions of U.S. dollars]

	Calendar years									
	1966–67	1968	1969	1970	1971	1972	1973	1974	1975	1976
Received by ADB from United States:										
Capital Subscription	20	10	10	10	......	[1] 24	[2] 6	......	[1] 30	[1] 68
Net ADB bond sales in United States					49				74	173
Net ADB loan sales in United States		1	......	1	1	(*)	–1	3	1	–2
Investment income in United States	1	2	4	9	12	11	13	15	16	16
Total	21	18	14	20	62	35	18	18	121	255
Paid by ADB to United States:										
Procurement of goods				1	3	8	10	19	31	35
Interest to U.S. bondholders					2	5	4	4	7	13
Interest to U.S. loanholders						(*)	(*)	(*)	(*)	(*)
Administrative expenses	1	1	(*)	(*)	(*)	(*)	[3] 8	[3] 9	[3] 12	[3] 15
Staff retirement plan investments in United States			1	2	2	8	4	5	6	8
Total	1	1	1	3	7	16	26	37	56	71
Net receipts to United States [4]	–20	–12	–13	–17	–55	–19	8	19	–65	–184
Long-term investments in United States	21	23	8	–14	23	21	100	67	79	107
Net effect on liquidity	1	11	–5	–31	–32	2	108	86	14	–77

[1] Includes encashment of demand obligations.

[2] Amount paid in respect of maintenance of value due to the devaluation of the U.S. dollar.

[3] Amounts paid in U.S. dollars but not necessarily spent in the U.S.

[4] Minus sign indicates negative impact on the U.S. balance of payments measured on a liquidity basis.

(*) Less than $500,000.

Source: Asian Development Bank.

TABLE I-8.—*ADB Borrowings and Outstanding Issues as of June 30, 1977*

[Millions of U.S. dollar equivalents]

Currency issue	Number of issues	Original amount	Outstanding amount	Outstanding issues
Total	40	1,306.4	1,140.3	36
U.S. dollars	12	550.5	415.5	8
Austrian schillings	2	16.7	9.6	2
Belgian francs	1	11.1	11.1	1
Deutsche marks	6	194.3	184.4	6
Italian lire	1	11.3	11.3	1
Japanese yen	6	278.4*	268.6	6
Kuwaiti dinars	1	17.4	17.4	1
Luxembourg francs	1	11.1	10.4	1
Netherlands guilders	4	91.6	91.6	4
Saudi Arabian riyals	1	14.4	14.4	1
Swiss francs	5	109.6	106.0	5

* Net of cancellation.

Source: Asian Development Bank.

TABLE I-9.—*ADB Gross Borrowings During the Period June 30, 1976 to July 1, 1977*

[Millions of U.S. dollar equivalents]

Date		Total	New funds	Old funds
Total		219.7	149.7	70.0
Aug. 1, 1976	8⅝ percent U.S. dollar, 10-year notes of 1976	75.0	75.0	
Sept. 30, 1976	6¼ percent Swiss franc, 15-year loan of 1976	32.5	32.5	
Apr. 1, 1977	7 percent Deutsche mark, 8-year bonds of 1977	42.2	42.2	
Apr. 1, 1977	6½ percent U.S. dollar, 2-year bonds of 1977	70.0		70.0

NOTE.—Amounts are expressed in the U.S. dollar conversion rate as adopted by the Bank as of June 30, 1977.

Source: Asian Development Bank.

TABLE I-10.—*Asian Development Bank Special Funds resources—estimated effect of operations on the U.S. balance of payments from inception of ADB through calendar year 1976* [1]

[In thousands of U.S. dollars]

	Calendar years								
	1968	1969	1970	1971	1972	1973	1974	1975	1976
Received by ADB from United States:									
Special Funds contributions	126	112	585	427					[2] 6,467
Investment income to United States				136	289	968	1,574	1,281	1,225
Total	126	112	585	563	289	968	1,574	1,281	7,692
Paid by ADB to United States:									
Procurement of goods			200	303	212	161	292	2,815	1,968
Administrative expenses [3]	126	112	1,012						
Total	126	112	1,212	303	212	161	292	2,815	1,968
Net receipts to United States			627	–260	–77	–807	–1,282	1,534	–5,724
Long-term investments in United States						4,000	4,500	1,500	3,500
Net effect on liquidity basis			627	–260	–77	3,193	3,218	3,034	–2,224

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[1] Includes the Asian Development Fund established in 1974.

[2] Represents encashment of demand obligations.

[3] Administrative expenses are disbursed from ordinary capital resources. In 1971 an administration charge for special operations was instituted. Such administration charge has been included and shown in the administrative expenses paid under ordinary capital resources.

Source: Asian Development Bank.

SECTION J.—African Development Fund

TABLE J-1.—*African Development Fund, Loans Approved, July 1, 1976–June 30, 1977*

Country	Sector/Project	Date approved	Amount (in U.S. $ millions)
Benin	Health: Health Training	6/27/77	5.5
Burundi	Public Utilities: Bujumbura Sewerage	8/24/76	5.0
Chad	Agriculture: Sategui-Dorresia Irrigation	10/26/76	4.4
	Education: National Institute of Science and Education	11/22/76	4.8
Ethiopia	Agriculture: Ambira Irrigation	2/21/77	5.5
Guinea Bissau	Education: Bissau Technical School	8/24/76	4.4
Lesotho	Public Utilities: Maseru Water Supply	6/27/77	6.4
Madagascar	Transportation: Bealanana-Antesahebe Road	4/4/77	4.1
Malawi	Agriculture: Namwera Rural Development	10/26/76	5.5
	Public Utilities: Water Supply	12/14/76	5.5
Mali	Agriculture: Seed Production	10/26/76	4.8
	Agriculture: Rural Development	4/29/77	6.0
Mauritania	Public Utilities: Nouakchott Water and Sewerage (Supplement)	11/22/76	1.0
Mozambique	Transport: Nampevo-Alfo Molocue Road	4/29/77	8.9
Rwanda	Public Utilities: Kigale Water Supply	10/26/76	5.7
	Public Utilities: Butare Water Supply	12/14/76	2.8
	Agriculture: Gisuvu Tea Development	2/21/77	5.3
Sierra Leone	Education: Bunumbu Teachers College	6/27/77	5.5
Somalia	Transport: Hargeisa-Baroma Road	6/6/77	5.5
	Education: Textbook Printing	4/4/77	1.7
Tanzania	Public Utilities: Shinganga-Lindi Water Supply	8/24/76	5.5
	Transport: Rusumo Lusahunga Road	2/21/77	8.9
Upper Volta	Agriculture: Rural Development	4/29/77	5.5
Total			118.2

NOTE.—For purposes of this Report, loan commitments of the AFDF are quoted in U.S. dollar equivalents. The accounts of the AFDF are kept in Units of Account (U.A.) equivalent to 0.81851265 gramme of fine gold. Data in this table have been converted into U.S. dollars at the rate of U.S. $1.11 per U.A. Detail may not add to total due to rounding.

Source: African Development Fund.

TABLE J-2.—*African Development Fund, Loan Commitments and Disbursements, from inception through June 30, 1977.*

[Millions of U.S. dollar equivalents]

	Number of loans	Commitments	Disbursements
Total	70	286.6	23.8
Year ending June 30:			
1977	23	118.2	14.9
1976	22	92.3	8.8
1975	15	52.7	NA
1974	10	23.5	NA

NOTE.—For purposes of this Report, subscriptions to the AFDF are quoted in U.S. dollar equivalents. The accounts of the AFDF are kept in Units of Account (U.A.) equivalent to 0.81851265 gramme of fine gold. Data in this Table have been converted into U.S. dollars at the rate of U.S. $1.11 per U.A.

Source: African Development Fund.

TABLE J-3.—*African Development Fund, Statement of Subscriptions and Voting Power as of June 30, 1977.*

Participant	Subscription (U.S. $ million equivalents)	Voting power percent
African Development Bank	7.2	50.00
Belgium	3.3	.46
Brazil	6.7	.93
Canada	75.0	10.52
Denmark	18.9	2.65
Finland	6.7	.93
Germany	41.6	5.84
Italy	11.1	1.55
Japan	50.0	7.01
Netherlands	20.0	2.80
Norway	25.0	3.50
Saudi Arabia	10.0	1.40
Spain	10.0	1.40
Sweden	30.0	4.20
Switzerland	20.6	2.89
United Kingdom	5.8	.81
United States	15.0	2.10
Yugoslavia	6.6	.93
Total	363.6	....

NOTE.—For purposes of this Report, subscriptions to the AFDF are quoted in U.S. dollar equivalents. The accounts of the AFDF are kept in Units of Account (U.A.) equivalent to 0.81851265 gramme of fine gold. Data in this Table have been converted into U.S. dollars at the rate of U.S. $1.11 per U.A.

Source: African Development Fund.

SECTION K.—Agency for International Development

TABLE K-1.—*Development Loan Authorizations, Transition Quarter*

[In millions of U.S. dollars]

Country	Project	Amount	Government		
			Interest rate or fee	Maturity (years)	Grace period (years)
Bangladesh	Fertilizer Storage	5.250	2–3	40	10
Israel	Program Assistance	25.0	2–3	40	10
Haiti	Integrated Agricultural Development	8.0	2–3	40	10
Pakistan	Agricultural Inputs (Amendment 1)	25.0	2–3	40	10
Syria	Basic Inputs and Production	15.0	2–3	40	10
Portugal	Lower Income Housing	10.0	5	25	5
Indonesia	Surakarta—Potable Water	6.8	2–3	40	10
ROCAP	Regional Rural Agribusiness	15.0	2–3	30	10
Egypt	Basic Import and Production	65.0	2–3	40	10
Jordan	Jordan Valley Sprinkler Irrigation Equipment	8.0	2–3	40	10
Egypt	National Energy Control Center	24.0	2–3	40	10
Zaire	North Shaba Maize Production	3.5	2–3	40	10

Source: Agency for International Development.

TABLE K-2.—*Development Loan Authorizations, fiscal year 1977*

[In millions of U.S. dollars]

Country	Project	Amount	Government		
			Interest rate or fee	Maturity (years)	Grace period (years)
Tunisia	HIG	10.0	See Sec. 223(f) of FAA.	30	5
Philippines	Local water development I (Amendment)	10.0	2–3	40	10
Yemen	Taiz Water and Sewage (1st Amendment)	1.350	2–3	40	10
Paraguay	Rural enterprises (Amendment)	2.5	2–3	40	10
Pakistan	Basic health services	13.5	2–3	40	10
Israel	Program assistance	245.0	2–3	40	10
Zambia	Commodity import loan	20.0	2–3	40	10
Philippines	Integrated agriculture production and marketing	3.0	2–3	40	10
Panama	Nuevo Chorrillo Housing Cooperative	3.4	Sec 223(f) of FAA.	25	
Haiti	Small farmer improvement (Amendment)	6.0	2–3	40	10
Honduras	Small farmer technologies	6.0	2–3	40	10
Kenya	Roads gravelling	7.7	2–3	40	10
Guatemala	Primary school reconstruction	5.2	2–3	40	10
Tunisia	Rural development	3.2	2–3	30	10
Nicaragua	Rural development sector loan (Amendment)	6.7	2–3	40	10
Egypt	Commodity import program loan	440.0	2–3	40	10
Thailand	Agricultural extension outreach	3.0	2–3	40	10
Chile	On-farm irrigation	7.0	2–3	20	7
Kenya	Livestock development loan (Amendment 1)	3.250	2–3	40	10
Jordan	Yarmouk-Dead Sea road (Amendment 1)	1.0	2–3	40	10
Jordan	Jordan Valley Village Development (Amendment 1)	5.5	2–3	40	10
Bolivia	Rural education II—teacher training	10.0	2–3	40	10
Nicaragua	Rural education development	10.0	2–3	30	10
Bolivia	Rural sanitation	4.0	2–3	40	10
Caribbean Regional	Regional agribusiness development	6.5	2–3	40	10
Zaire	Commodity import	16.6	2–3	40	10
Honduras	Aguan Valley Rural Electrification	10.0	3–4	25	10
	(Sub-borrowers)		(2–3)	(40)	(10)
Sri Lanka	Malaria control	12.0	2–3	40	10
Liberia	Rural access roads, phase III	5.2	2–3	40	10
Thailand	Lam Nam Oon integrated rural development	4.5	2–3	40	10
Sri Lanka	Mahaweli Ganga irrigation	5.2	2–3	40	10
Syria	Agricultural machinery and production inputs	40.0	2–3	40	10
Philippines	Crop protection	5.0	2–3	40	10
Jordan	Jordan valley irrigation, stage II	5.0	2–3	40	10
Guatemala	Small farmer marketing	3.4	2–3	30	10
Bangladesh	Rural electrification	16.0	2–3	40	10
Pakistan	Rural roads	8.7	2–3	40	10
Indonesia	Science and technology	6.5	2–3	40	10
Indonesia	Provincial area development I	6.0	2–3	40	10
Peru	Rural development agribusiness fund	15.0	2–3	20	7
Indonesia	Rural electrification I	48.0	2–3	40	10
Indonesia	Professional resources development I	5.9	2–3	40	10

See footnote at end of table.

TABLE K-2.—*Development Loan Authorizations, fiscal year 1977*—Continued

[In millions of U.S. dollars]

Country	Project	Amount	Government		
			Interest rate or fee	Maturity (years)	Grace period (years)
Israel	HIG	25.0	See Sec. 223(f) of FAA.	30	....
Bolivia	Agriculture sector II	11.3	2–3	40	10
Panama	Integrated rural development	9.7	2–3	20	10
Egypt	Irrigation pumps	11.0	2–3	40	10
Portugal	Rural vocational education	6.0	5	25	5
Syria	Rural electrification	34.7	2–3	40	10
Egypt	Helwan and Talka gas turbines (Amendment)	19.0	8½	25	5
Panama	Education sector II	2.5	2–3	40	10
Portugal	Health sector support	17.0	5	25	5
Bolivia	Agribusiness and artisanry	6.2	2–3	40	10
Philippines	Bicol integrated area development II	2.250	2–3	40	10
Jamaica	Urban and rural shelter improvement	15.0	See Sec. 223(f) of FAA.	30	10
Lebanon	Low income housing	15.0	See Sec. 223(f) of FAA.	30	....
Panama	Slum upgrading and home improvement	14.0	See Sec. 223(f) of FAA.	30	10
Egypt	Agricultural canal reconstruction and maintenance	26.0	2–3	40	10
Egypt	Cairo water	30.0	2–3	40	10
Egypt	Urban electrical distribution	17.012	2–3	40	10
Pakistan	Malaria control, Amendment I	4.0	2–3	40	10
Korea	HIG	40.0	See Sec. 223(f) of FAA.	30	10
Costa Rica	Commodity systems	5.5	3	20	5
Guatemala	Rural electrification	10.8	2–3	30	10
Sri Lanka	Agricultural base mapping	4.5	2–3	40	10
Indonesia	Sumatra agricultural research	7.0	2–3	40	10
Indonesia	Agricultural development planning and administration	5.0	2–3	40	10
Egypt	Alexandria sewage	15.0	2–3	40	10
Egypt	Grain, tallow, oil and fats storage and distribution	42.0	2–3	40	10
Pakistan	Primary education	7.0	2–3	40	10
Guyana	Roads	6.2	2–3	40	10
Jamaica	Rural education sector loan amendment	2.1	2–3	30	5
Portugal	Basic sanitation II	12.0	5	25	5
Pakistan	Agricultural inputs, third tranche	25.0	2–3	40	10
Tunisia	Rural community health	3.0	2–3	30	10
Liberia	Upper Bong County rural integrated development	6.6	2–3	40	10
Portugal	School construction II	15.0	5	25	5
Jordan	Rural and urban electrification	9.0	2–3	40	10
Kenya	Rural roads system	13.0	2–3	40	10
Nicaragua	Nutrition improvement program	3.0	2–3	30	10
Jamaica	Integrated rural development	13.0	2–3	20	5
Sri Lanka	Paddy storage and processing	5.4	2–3	40	10

Source: Agency for International Development.

SECTION L.–Department of Agriculture

TABLE L–1.—*Public Law 480, convertible local currency credit sales agreements and amendments to agreements signed July 1, 1976 to September 30, 1976 (TQ)*

[In millions of U.S. dollars]

Country	Commodity	Market value	Credit period[1]		
			Total years	Years before 1st payment is due	Interest rate percent[2]
Total		92.2			
Afghanistan	Soybean/cottonseed oil	2.6	40	10	3.0
Guinea	Rice	2.4	30	6	3.0
Indonesia	Rice	43.6	25	6	4.0
Korea	Wheat/wheat flour	14.0	40	10	3.0
Pakistan	Soybean/cottonseed oil	9.2	40	10	3.0
Pakistan	Wheat/wheat flour	18.8	40	10	3.0
Zambia	Vegetable oil	1.6	40	10	3.0

[1] Payments made in approximately equal annual installments.

[2] Interest rate after first payment of principal due. The rate prior to this is usually 2 percent.

Source: Department of Agriculture.

TABLE L–2.—*Public Law 480, dollar credit sales agreements and amendments to agreements signed July 1, 1976 to September 30, 1976 (TQ)*

[In millions of U.S. dollars]

Country	Commodity	Market value	Credit period[1]		
			Total years	Years before 1st payment is due	Interest rate percent[2]
Total		26.7			
Egypt	Wheat/wheat flour	15.4	20	2	3.0
Israel	Wheat/wheat flour	3.8	20	2	3.0
Jamaica	Blended/fortified foods/soybean cottonseed oil	2.5	18	1	3.0
Portugal	Rice	5.0	16	2	4.5

[1] Payments made in approximately equal annual installments.

[2] Interest rate after first payment of principal due. The rate prior to this is usually 2 percent.

Source: Department of Agriculture.

TABLE L–3.—*Public Law 480, convertible local currency credit sales agreements and amendments to agreements signed October 1, 1976 to September 30, 1977*

[In millions of U.S. dollars]

Country	Commodity	Market value	Credit period[1]		
			Total years	Years before 1st payment is due	Interest rate percent[2]
Total		389.7			
Bangladesh	Wheat/wheat flour	22.6	40	10	3.0
Bangladesh	Wheat/wheat flour, rice	28.0	40	10	3.0
Bangladesh	Soybean/cottonseed oil	7.2	40	10	3.0
Bangladesh	Soybean/cottonseed oil	6.0	40	10	3.0
Guinea[3]	Rice	0.7	30	6	3.0
Haiti	Wheat/wheat flour, soybean/cottonseed oil	7.7	40	10	3.0
Haiti	Corn/grain sorghum, rice	3.6	40	10	3.0
India	Soybean/cottonseed oil	26.0	40	10	3.0
Indonesia	Wheat/wheat flour, bulgur	24.8	25	6	4.0
Indonesia	Rice	9.0	25	6	4.0
Indonesia	Wheat/wheat flour, rice	46.7	25	6	4.0
Indonesia	Wheat/wheat flour, rice	19.8	25	6	4.0
Jamaica	Wheat/wheat flour, corn/grain sorghum, soybean/cottonseed oil	12.0	12	3	3.0
Korea	Wheat/wheat flour, rice, cotton	35.3	40	10	3.0
Korea	Wheat/wheat flour	43.8	40	10	3.0
Pakistan	Soybean/cottonseed oil	37.1	40	10	3.0
Sierra Leone	Wheat/wheat flour, tobacco	1.3	40	10	3.0
Sri Lanka	Wheat/wheat flour, rice	23.1	40	10	3.0
Sri Lanka	Wheat/wheat flour	16.8	40	10	3.0
Sudan	Wheat	4.8	40	10	3.0
Tanzania	Rice, corn/grain sorghum	8.0	40	10	3.0
Zambia	Wheat/wheat flour, soybean/cottonseed oil	5.4	40	10	3.0

[1] Payments made in approximately equal annual installments.

[2] Interest rate after first payment of principal due. The rate prior to this is usually 2 percent.

[3] Additional money for TQ agreement with FY 77 Supply Period.

Source: Department of Agriculture.

TABLE L-4.—*Public Law 480, dollar credit sales agreements and amendments to agreements signed October 1, 1976 to September 30, 1977*

[In millions of U.S. dollars]

Country	Commodity	Market value	Credit period[1] Total years	Credit period[1] Years before 1st payment is due	Credit period[1] Interest rate percent[2]
Total		375.4			
Chile[3]	Wheat/wheat flour	15.0	20	2	3.0
Dominican Republic	Corn/grain sorghum	2.6	20	2	3.0
Egypt	Wheat/wheat flour, tobacco	137.2	20	2	3.0
Egypt	Wheat/wheat flour, feed grains, dry beans, tobacco	60.0	20	2	3.0
Israel	Wheat/wheat flour	7.4	20	2	3.0
Jordan	Wheat/wheat flour	5.5	20	2	3.0
Jordan	Wheat/wheat flour	4.8	20	2	3.0
Lebanon	Wheat/wheat flour, rice	7.2	20	2	3.0
Morocco	Wheat/wheat flour	10.0	20	2	3.0
Philippines	Tobacco	13.2	20	2	3.0
Portugal	Wheat, rice, corn/grain sorghum, cotton, tobacco	50.0	16	2	4.5
Portugal	Wheat, corn/grain sorghum	20.0	16	2	4.5
Syria	Rice, tobacco	15.0	20	2	3.0
Tunisia	Wheat/wheat flour	4.8	20	2	3.0
Tunisia	Wheat/wheat flour	3.9	20	2	3.0
Zaire	Rice, corn/grain sorghum, tobacco	14.9	20	2	3.0
Zaire	Rice	3.9	20	2	3.0

[1] Payments made in approximately equal annual installments.

[2] Interest rate after first payment of principal due. The rate prior to this is usually 2 percent.

[3] Signed but not implemented.

Source: Department of Agriculture.

TABLE L-5.—*Lines of credit approved under the CCC export credit sales program during fiscal year 1977*

[In millions of dollars]

Country Commodity	Value of FY 1977 authorizations	Credit period (Months)
Australia	13.0	
Tobacco	6.5	12*
Tobacco	6.5	12
Belgium	1.2	
Tobacco	1.2	12*
Bolivia	10.0	
Wheat	10.0	36
Cyprus	7.0	
Wheat	1.0	36
Feed grains	6.0	36
Dominican Republic	30.0	36
Rice	10.4	
Soybean oil	12.1	
Corn	5.5	
Dry edible beans	2.0	
Ecuador	1.0	
Soybean oil	1.0	36
Greece	81.0	
Corn	75.0	36
Barley	6.0	
Indonesia	9.0	
Cotton	9.0	12
Ireland	9.6	
Tobacco	9.6	12*
Jamaica	10.0	
Corn	5.0	
Wheat/wheat flour	5.0	24*
Korea	286.5	
Cotton	180.0	36
Wheat	75.0	12
Barley	27.5	36
Tallow	4.0	12
Morocco	4.0	
Breeding cattle	4.0	36
New Guinea	.04	
Tobacco	.04	12*
New Zealand	12.9	
Tobacco	6.5	12*
Tobacco	6.4	6*
Nigeria	8.0	
Corn/sorghum	8.0	12*
Norway	.8	
Tobacco	.8	12*
Pakistan	24.0	
Soybean oil	24.0	36
Panama	8.0	12*
Rice	1.1	
Soybean oil	5.0	
Feed grains	1.0	
Dry edible peas/beans	.9	
Peru	88.0	
Feed grains	25.0	36
Soybeans	6.0	
Wheat	26.0	
Corn	21.0	
Soybean oil	10.0	
Philippines	134.1	
Cotton	5.0	12*
Cotton	10.0	36*
Tobacco	25.0	12*
Feed grains	13.5	36*
Wheat	80.6	36*
Poland	327.0	
Wheat	115.0	
Feed grains	165.0	
Cotton	10.0	36
Tobacco	11.0	
Soy-protein	6.0	
Lard	20.0	
Portugal	117.5	
Wheat	32.2	
Feed grains	79.3	36
Tallow	4.0	
Dairy breed cattle	2.0	
Sri Lanka	10.0	
Wheat/wheat flour	10.0	24*
South Africa	9.3	
Rice	8.0	12
Soy-protein	1.3	6*
Syria	22.5	
Wheat/wheat flour	11.8	
Rice	5.3	36
Vegetable oils	4.3	
Corn	1.1	
Thailand	22.0	
Cotton	15.0	12
Tobacco	7.0	36
United Kingdom	21.0	
Tobacco	21.0	12*
Grand Total	1,267.44	

* U.S. Bank Obligation.

Source: Department of Agriculture.

SECTION M.–Overseas Private Investment Corporation

TABLE M-1.—*OPIC total insurance issued in fiscal year 1977 (includes Transition Quarter)*
[In millions of dollars]

Maximum coverage

Area	Percent	Total	Type of Coverage		
			Inconvertibility	Expropriation	War risk
All Areas	100	756.0	255.0	268.9	232.1
Latin America	33.7	254.7	93.1	95.3	66.3
East Asia	23.3	176.1	71.0	54.1	51.0
Africa	17.2	129.9	41.2	45.1	43.6
Near East	25.5	193.2	49.0	73.7	70.5
Others	.3	2.1	.7	.7	.7

Source: Overseas Private Investment Corporation.

TABLE M-2.—*OPIC total insurance outstanding as of September 30, 1977*
[In millions of dollars]

Maximum coverage

Area	Percent	Total	Type of Coverage		
			Inconvertibility	Expropriation	War risk
All Areas	100	9,113.9	2,910.4	3,377.5	2,826.0
Latin America	42.3	3,852.7	1,125.5	1,510.8	1,216.4
East Asia	33.4	3,047.2	981.3	1,087.4	978.5
Africa	11.5	1,045.6	362.1	388.4	295.1
Near East	11.7	1,067.2	387.7	363.3	316.2
Others	1.1	101.2	53.8	27.6	19.8

Source: Overseas Private Investment Corporation.

TABLE M-3.—*OPIC total finance portfolio outstanding by region as of September 30, 1977*

[In millions of dollars]

Area	Percent	Total	Direct investment fund [1]	Investment guaranty [2]
All areas	100	197.5	32.8	164.7
Latin America	22.0	43.4	19.4	24.0
Africa	17.6	34.8	8.6	26.2
East Asia	53.5	105.6	4.4	101.2
Near East and South Asia	6.9	13.7	.4	13.3

[1] Original loan amounts less participation.

[2] Includes guaranteed participations in OPIC direct loans.

Source: Overseas Private Investment Corporation.

TABLE M-4.—*OPIC finance portfolio activity by region in fiscal year 1977**

[In millions of dollars]

Area	Percent	Total	Direct investment fund	Investment guaranty
All areas	100	6.6	6.6	0
Latin America	92.4	6.1	6.1	0
Africa	3.0	.2	.2	0
East Asia	4.5	.3	.3	0
Near East and South Asia	0	0	0	0

* Includes Transition Quarter data.

Source: Overseas Private Investment Corporation.

SECTION N.—Export-Import Bank of the United States

TABLE N–1.—*Authorizations by area in fiscal year 1977*

	Loans	Guarantees	Medium-term insurance	Short-term insurance	Total
Africa	159,608,933	176,613,417	38,015,262	240,098,219	614,335,831
Asia	302,101,878	232,417,235	129,258,253	736,980,125	1,400,757,491
Canada		609,965	646,434	219,945,636	221,202,036
Europe	163,693,335	258,332,000	41,639,312	892,784,094	1,356,448,741
Latin America	111,639,289	343,443,617	210,104,866	1,021,922,080	1,687,109,852
Oceania	10,223,161	4,139,713	5,843,797	91,772,455	111,979,126
Miscellaneous		5,188,945			5,188,945
Total by area	747,266,597	1,020,744,892	425,507,924	3,203,502,611	5,397,022,024
Discount loans	473,481,332				473,481,332
Short-term insurance authorized but unshipped				−253,990,611	−253,990,611
Prior fiscal year adjustments			−16,684,123		−16,684,123
Total authorizations	1,220,747,929	1,020,744,892	408,823,801	2,949,512,000	5,599,828,621

Source: Export-Import Bank of the United States.

TABLE N-2.—*Authorizations by country in fiscal year 1977*

	Loans	Guarantees	Medium-term insurance	Short-term insurance	Total
Afghanistan				2,450,000	2,450,000
Algeria	82,343,500	39,385,564	11,829,775	15,849,928	149,408,767
Angola			895,308	1,183,562	2,078,870
Antigua				7,718,107	7,718,107
Argentina	15,523,101	41,766,931	18,620,235	14,928,540	90,838,807
Australia	623,161	3,621,060	4,173,196	85,566,709	93,984,126
Austria		62,550	23,098	9,001,329	9,086,977
Azores				3,548	3,548
Bahamas			535,432	16,519,182	17,054,614
Bahrein			1,117,700	8,034,326	9,152,026
Barbados		7,156		7,635,024	7,642,180
Belgium		813,420		71,265,865	72,079,205
Belize			20,200	2,247,071	2,267,271
Benin, Peoples Republic of				376,120	376,120
Bermuda				3,145,677	3,145,677
Bolivia	15,739,929	12,347,377	13,305,311	12,696,478	54,089,095
Brazil	56,404,341	43,729,502	11,659,733	134,129,490	245,923,066
Brunei				4,757	4,757
Burma, Union of			2,632,756	100,000	2,732,756
Burundi				22,974	22,974
Cameroon, Federal Republic of			167,085	803,621	970,705
Canada		609,965	646,434	219,934,746	221,191,145
Canary Islands				2,672,829	2,672,829
Cayman Islands		176,641	77,161	60,000	313,802
Central African Empire	307,180	33,037		190	340,407
Chile		4,074,651	8,401,490	29,497,152	41,973,294
China, Republic of (Taiwan)	120,991,181	19,275,014	975,800	50,577,174	191,819,168
Colombia	33,374	12,270,262	12,796,372	44,408,253	69,508,262
Costa Rica	127,749	11,036,731	6,534,270	25,503,131	43,201,881
Cyprus			393,300	1,968,977	2,362,277
Denmark	9,465,000	90,270	1,225,506	16,483,703	27,264,479
Dominican Republic	523,944	2,942,781	1,960,113	20,261,015	25,687,853
Ecuador		28,128,192	20,156,657	74,846,131	123,130,980
Egypt, Arab Republic of				1,236,000	1,236,000
El Salvador	184,526	2,820,215	2,555,996	10,036,169	15,596,906
Ethiopia				32,072	32,072
Fiji Islands				150,003	150,003
Finland	9,090,000			16,834,585	25,924,585
French Territory of the Afars and Issas				175,361	175,361
France	637,500	66,097,084	705,848	47,717,401	115,157,834
Gabon		28,308,558	2,697,026	2,661,357	33,666,941
Gambia, The				9,703	9,703
Germany, Federal Republic of			727,594	70,029,220	70,756,814
Ghana	7,155,000	2,385,000		363,147	9,903,147
Gibraltar				5,630	5,630
Greece		7,458,524	9,985,379	16,470,154	33,914,057
Greenland				12,046	12,046
Guatemala	6,200,000	8,900,689	8,102,754	36,660,646	59,864,088
Guiana—French				22,840	22,840
Guinea				6,000	6,000
Guyana		4,434,854	2,291,664	10,006,141	16,732,659
Haiti				651,726	651,726
Honduras	226,903	6,870,422	4,850,769	17,488,677	29,436,771
Hong Kong		900,000	811,181	21,731,734	23,442,915
Iceland		1,017,000	58,442	3,456,910	4,532,353
India			1,104,660	8,613,712	9,718,372

TABLE N-2.—*Authorizations by country in fiscal year 1977*—Continued

	Loans	Guarantees	Medium-term insurance	Short-term insurance	Total
Indonesia	12,855,600	25,559,939	16,336,741	44,024,958	98,777,238
Iran		4,663,517	22,457,881	100,577,229	127,698,627
Iraq				14,130,530	14,130,530
Ireland			2,799	7,427,271	7,430,070
Israel	2,355,940	74,577,403		31,642,657	108,576,000
Italy			7,362,532	81,737,427	89,099,959
Ivory Coast, Republic of the	6,650,145	4,785,960	457,100	10,210,445	22,103,650
Jamaica		1,542,173	274,655	32,715,103	34,531,931
Japan	46,615,200	1,088,545	55,584	74,548,751	122,308,080
Jordan		22,053,633	801,725	7,621,274	30,476,632
Kenya	10,700,000	800,000		2,514,569	14,014,569
Korea, Republic of	76,888,217	41,420,520	2,056,900	26,887,277	147,252,913
Kuwait		1,461,726	56,825,601	49,624,149	107,911,476
Lebanon			48,563	12,146,598	12,195,161
Lesotho				242	242
Liberia	5,568,210	2,828,800	960,000	22,553,590	31,910,600
Libya			2,137,393	7,251,849	9,389,242
Liechtenstein				552,526	552,526
Luxembourg				696,090	696,090
Malagasy Republic		22,800,000		1,966,489	24,766,489
Malawi				1,605,468	1,605,468
Malaysia, Federation of		251,575	2,133,026	20,290,310	22,674,911
Mali				110,203	110,203
Malta				42,582	42,582
Mauritania		76,800		1,255,911	1,332,711
Mauritius				295,577	295,577
Mexico	10,112,515	38,557,207	41,939,938	124,256,901	214,866,561
Morocco	11,050,000	25,784,750		9,597,849	46,432,599
Mozambique		4,239	69,650	4,161,400	4,235,289
Nepal				176	176
Netherlands		816,000	17,363	137,521,464	138,354,828
New Hebrides				151	151
New Zealand	9,600,000	518,653	1,581,273		11,699,926
Nicaragua	3,848,539	6,372,602	4,937,079	29,527,797	44,686,017
Niger		3,200,000		65,218	3,265,218
Nigeria		118,575	2,446,994	24,471,873	27,037,442
Norway	3,750,676	1,096,002	1,794,769	42,860,742	46,906,190
Oman			279,500	5,161,264	5,440,764
Pacific Islands—British				531,075	531,075
Pacific Islands—French				1,267	1,267
Pakistan				4,149,338	4,149,338
Panama		3,608,755	4,451,303	37,425,667	45,485,724
Papua New Guinea			89,328	33,473	122,801
Paraguay		407,368	4,912,256	2,035,946	7,355,570
Peru	2,714,369	73,351,947	16,342,321	41,728,185	134,136,821
Philippines	33,300	6,725,324	1,045,600	11,677,207	19,481,431
Poland	3,908,733	1,912,500			5,821,233
Portugal	689,160	3,918,020	422,559	11,376,876	16,406,615
Qatar			1,603,905	10,190,653	11,794,558
Reunion Island				177,694	177,694
Romania	5,281,775	2,134,080		3,711,570	11,127,425
Ryukyu Islands				880,000	880,000
Saudi Arabia		6,057,140	7,211,832	131,071,503	144,340,475
Senegal	4,420,000	4,598,713	1,618,600	141,165	10,778,478
Seychelles				21,000	21,000
Sierra Leone	5,138,393			191,178	5,329,572
Singapore	6,050,000		1,519,177	27,399,047	34,968,224

TABLE N-2.—*Authorizations by country in fiscal year 1977*—Continued

	Loans	Guarantees	Medium-term insurance	Short-term insurance	Total
South Africa, Republic of		17,283,084	13,975,887	85,143,831	116,402,802
Spain	100,458,607	61,956,470	5,837,974	55,519,374	223,772,424
Sri Lanka				113,029	113,029
St. Pierre and Miquelon				10,892	10,892
Sudan, The		8,253,965		507,948	8,761,913
Surinam		225,000	208,800	13,135,436	13,569,236
Swaziland				847,642	847,642
Sweden	14,000,000	18,388,010	1,253,612	56,334,845	89,976,467
Switzerland			1,113,368	24,854,344	25,967,712
Syrian Arab Republic				1,475,578	1,475,578
Tahiti				706,170	706,170
Tanzania		2,800,000		11,902,867	14,702,867
Thailand	2,221,797	3,450,575	1,718,104	15,138,674	22,529,150
Tinor				2,802	2,802
Togo, Government of		10,172,372		1,567,319	11,739,691
Trinidad and Tobago			325,900	39,841,861	40,167,761
Trust Territory Pacific Islands (United States)				4,783,483	4,783,483
Tunisia		1,606,500	760,400	3,981,464	6,348,364
Turkey	34,090,644	24,932,325	6,398,416	11,482,710	76,904,095
United Arab Emirates			2,123,600	45,193,838	47,317,438
United Kingdom	3,960,000	56,544,024	1,417,556	202,672,755	264,594,335
Upper Volta				849,275	849,275
Uruguay		690,915	3,078,455	17,916,031	21,685,400
Venezuela		39,181,247	21,503,435	194,228,734	254,913,416
Virgin Islands—British				66,456	66,456
West Indies—British				6,037,851	6,037,851
West Indies—French			170,793	1,914,955	2,085,748
West Indies—Netherlands			91,774	12,629,706	12,721,481
Western Samoa				124	124
Yenen Arab Republic				38,869	38,869
Yugoslavia	12,451,884	36,028,045	9,297,612	14,227,670	72,005,211
Zaire	26,276,506			7,068,035	83,344,540
Zambia		1,387,500	44	16,244,451	17,631,995
Unallocable		5,188,945			5,188,945
Total by country	747,266,597	1,020,744,892	425,507,924	3,203.502,611	5,397,022,024

Source: Export-Import Bank of the United States.

STUDY OF THE USE OF SOLAR ENERGY IN HOUSE OFFICE BUILDINGS

COMMUNICATION

FROM

THE ARCHITECT OF THE CAPITOL,

TRANSMITTING

A REPORT [illegible]
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STUDY OF THE USE OF SOLAR ENERGY IN HOUSE OFFICE BUILDINGS

COMMUNICATION

FROM

THE ARCHITECT OF THE CAPITOL

TRANSMITTING

A REPORT ON THE STUDY OF THE FEASIBILITY OF THE USE OF SOLAR ENERGY FOR THE HOUSE OFFICE BUILDINGS, PURSUANT TO SECTION 1 OF HOUSE RESOLUTION 322, 95th CONGRESS

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THE ARCHITECT OF THE CAPITOL
1793
Washington, D.C. 20515

April 28, 1978

Honorable Thomas P. O'Neill, Jr.
Speaker
United States House of Representatives
Washington, D.C. 20515

Dear Mr. Speaker:

I have attached, a copy of a Study and Report on the Feasibility of the Use of Solar Energy for the House Office Buildings in accordance with House Resolution 322 of May 17, 1977, 95th Congress.

This report, prepared under my direction by Mr. Sidney A. Silver, P.E., Consulting Engineer of Chevy Chase, Maryland, evaluates the use of solar energy as a heat source for domestic water heating, building space heating, and for building air conditioning to partially displace steam generated through the use of coal and oil. House Office Building Annex No. 1 (former Congressional Hotel) was not included in the study since it is considered a temporary building. Each of the other buildings in the House Office Building Complex is treated separately in the report.

Even though the possibility is included in the report, I do not recommend the installation of solar collectors on the roofs of the Cannon and Longworth House Office Buildings due to the limited size and unique shape of the copper roof areas and also because of aesthetic concerns for these historic structures. Constraints were also imposed on the use of the Rayburn Building flat roof area in that I do not consider it desirable, at this time, to install solar collectors on this building that can be seen from the Capitol Building and from ground level to the South or West. I do recommend, however, that consideration be given to such an installation for equipment that can be arranged so as not to be visible from the ground.

On the other hand, House Office Building Annex No. 2 (former FBI Identification Building) is not the type of structure that generates the same architectural concerns and, in fact, is in an ideal location to expose the solar collectors to high visibility from the expressway on the South and from the other buildings on Capitol Hill to the

North and East. It also has a very large structurally strong flat roof that makes it ideal for the addition of a large number of solar collectors.

The report recommends that solar collectors be installed on the House Office Building Annex No. 2 for domestic water heating year-round, for partial building heating during the winter season, and for partial cooling year-round. The House Computer Center is located in this building and there is a need for year-round cooling. Therefore, it is ideally suited for the concentrating type of solar collectors that track the sun and produce the higher temperature water required for absorption water chilling equipment. The estimated cost of installation is $1,223,800 to which must be added approximately 20% to cover engineering design fees and contingent and administrative costs.

The report also recommends that solar collectors, not visible from the ground, be installed on the Rayburn Building for domestic water heating year-round, for partial building heating during the winter season, and for reheating during the summer cooling season. The estimated cost of installation is $1,186,400 to which must be added approximately 20% to cover engineering design fees and contingent and administrative costs.

If solar energy installations are approved for both the Rayburn Building and House Office Building Annex No. 2, and if approximately $100,000 is added for special system monitoring devices, an appropriation of $3,000,000 will be required to fund this project. The report estimates a pay-back period of 15 to 20 years. However, since the future cost and availability of coal and oil are not exactly predictable and may be higher than shown in the report, and since the ultimate purpose is to conserve energy, I recommend that these projects be approved and that funds be made available as soon as possible so that the installation for House Office Building Annex No. 2 may proceed along with the other remodeling work presently taking place in that building.

Naturally, we may find it necessary to deviate from the detailed recommendations of the "Silver" report as final design considerations may require.

I shall, of course, be pleased to discuss this matter further as you may deem desirable.

Cordially,

George M. White, FAIA
Architect of the Capitol

STUDY AND REPORT
ON THE
FEASIBILITY OF THE USE OF SOLAR ENERGY
FOR THE
HOUSE OFFICE BUILDINGS
UNITED STATES HOUSE OF REPRESENTATIVES

1793

GEORGE M. WHITE, FAIA.
ARCHITECT OF THE CAPITOL

SIDNEY A. SILVER, P.E.
SILVER ASSOCIATES
CONSULTING ENGINEERS
8401 CONNECTICUT AVENUE
CHEVY CHASE, MARYLAND 20015
APRIL 1978

U.S. GOVERNMENT PRINTING OFFICE
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SILVER ASSOCIATES
Consulting Engineers

REPLY TO
HOME OFFICE
CHEVY CHASE LAKE BUILDING
8401 CONNECTICUT AVENUE
CHEVY CHASE, MARYLAND 20015
PHONE (301) 656-0272

FLORIDA OFFICE
FLORIDA CENTER BUILDING
5750 MAJOR BOULEVARD
ORLANDO, FLORIDA 32805
PHONE (305) 851-0260

April 17, 1978

The Honorable George M. White, FAIA
Architect of the Capitol
Washington, D.C. 20515

Dear Mr. White:

We are pleased to submit the Study and Report on the Feasibility of the Use of Solar Energy for Domestic Water Heating, Building Heating and Air Conditioning for the House Office Buildings in accordance with House Resolution 322 of May 17, 1977, 95th Congress.

The report contains engineering and economic analyses for various solar energy systems, so that determination can be made as to the type, size and configuration of solar panels most feasible for the intended use as per limitation of roof area.

We wish to thank the members of your staff and in particular Mr. J. Raymond Carroll, P.E., Director of Engineering, for his helpful guidance and cooperation in furnishing data as required for the preparation of the report.

We thank you for the opportunity in the undertaking of this study.

Very truly yours,

SILVER ASSOCIATES

Sidney A. Silver, P.E.

SAS/lc

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SECTION I

Introduction

I. Introduction

The purpose of this study is to determine the feasibility of providing solar energy for domestic water heating, for building heating, and for building air conditioning at various House office buildings in Washington, D.C.

Under consideration in this study are:

Rayburn House Office Building
Longworth House Office Building
Cannon House Office Building
House Office Building Annex #2

The general format of the study is as follows:

Section II.	Conclusions Reached Based on the Assembled Data
Section III.	Discussion of Analyses
Section IV.	Economic Analyses
Section V.	Engineering Analyses
Section VI.	Tables and Figures to Provide Data by Which the Analyses Have Been Formulated

The study for the Rayburn House Office Building is limited to the use of solar energy for domestic water heating and for building heating. No analysis is made for the use of solar energy for air conditioning due to the inability to install a cooling tower on the roof of the building without destroying the esthetics of the building, or the availability of space in the basement for the installation of an absorption chiller, as would be required with such a system. Due to the limitations imposed to conceal the solar collector panels on the roof of the building from vision along Independence Avenue and from the Capitol, and at the same time provide the maximum solar energy collection system, the optimum positioning of collectors may not always be possible. The study provides analyses of various solar collector sizes, configurations, and tilt angles to enable decision to be made to achieve favorable results.

Due to the construction and configuration of the roofs of the Longworth and Cannon Office Buildings, and the minimal available space to install solar collector panels, the study is limited to the use of solar energy for domestic water heating.

The House Office Building Annex #2 lends itself to total evaluation for the feasibility of use of solar collector systems for domestic water heating, building heating and air conditioning. Space is available on the roof of the first floor between building wings for the installation of the cooling tower required for air conditioning and space is available in the basement mechanical room for the installation of an absorption chiller. The maximum amount of solar collector panels that can be installed on the building roof to provide for domestic water and building heating is insufficient to provide total building air conditioning. Therefore, only a portion of the building air conditioning load is included in the analysis.

For the purpose of this report, PPG Industries double glazed flat plate solar collectors with flat black coated absorbers are analyzed for domestic water heating and for building heating with temperatures below 160°F. These collector panels are manufactured in 34" x 76" and 34" x 96" sizes. Other manufacturers that can provide similar solar collectors are:

Revere Copper and Brass, Inc.
Libby-Owens Ford Glass Company
Ray Pac, Inc.
Lennox Industries, Inc.
Sun Works, Inc.

For the purpose of this report, Northrup concentrating solar collectors having sun tracking facilities are analyzed for domestic water heating, building heating and air conditioning where water temperatures in excess of 200°F. are required. These collectors are manufactured in 8 ft. wide x 10 ft. high units, with each unit comprising four absorber tubes 12" wide x 10 ft. long. Other manufacturers that can provide similar solar collectors are:

Acurex Aerotherm
Energy Applications, Inc.
Hexcel, Inc.
Air Craft Armament Industries

SECTION II

Conclusions

II. Conclusions

Based on the analyses as herewith discussed, the following conclusions are reached:

A. Rayburn House Office Building

A flat plate solar collector system is found to be feasible to provide 46.1% of the annual energy required for domestic water heating, winter preheat of outdoor air supplied to the induction heating system, and summer reheat for environmental control of 14 committee rooms.

An estimated breakdown of energy saved is as follows:

	Annual Requirement Btu x 10^6	Solar Energy Savings Btu x 10^6	Percent of Load
Domestic Water Heating	2,592.0	1,254.8	48.4%
Winter Preheat	4,529.0	1,535.3	33.9%
Summer Reheat	1,479.4	1,171.7	79.2%
Total Annual	8,600.4	3,961.8	46.1%

See pages 125, 127 and 128 for energy requirements and page 137 for annual solar energy savings.

Solar energy savings for domestic water heating, winter preheat and summer reheat have been proportioned by months.

Annual utility savings of $32,193 during initial year is expected. (See page 69)

Over a 20 year period, based on projected rate increases, utility cost savings of $2,227,700 is anticipated. (See page 69)

To achieve the foregoing, the following installation of 34" x 96" flat plate solar collectors is required for the Rayburn House Office Building:

	Total Panels
On each of Four Building Quadrant Roof Areas:	
1 Row of 100 Panels in a 2-High Configuration at a 34° Tilt Angle	400
1 Row of 50 Panels in a 1-High Configuration at a 24° Tilt Angle	200
On the Existing Sloping Roof Facing the Court	
1 Row of 100 Panels in a 2-High Configuration	100
On each of the Two Penthouse Roofs	
2 Rows of 50 Panels in a 1-High Configuration at a Tilt Angle of 29°	200
Total Number of Panels	900
Total Solar Collector Area	17,928 sq.ft.

Solar Water Storage Tanks	Total Storage
In Each of Four Basement Wings will be Provided 2 - 1,500 gal. Tanks	12,000 gallons
In the Penthouse Mechanical Equipment Room 4 - 6,000 gal. Tanks	24,000 gallons
Total Storage	36,000 gallons

The estimated cost of the total installation including the installation of hot water coils in existing penthouse air handling equipment is determined to be $1,186,400. (See page 67). This cost is computed to be amortized in 15.7 years when maintenance and repair costs are taken into account, and the installation is deemed feasible (See page 70).

A typical example for determining the amortization period or the time it takes to pay off the initial investment cost through energy savings, is found on page 61.

Interconnecting piping between the solar panels and the penthouse mechanical equipment room for each of the domestic water storage tanks, heat exchangers and pumps in the basement of the four quadrants can be installed through existing pipe shafts.

In the design of a roof top solar collector system for the Rayburn House Office Building, extreme care must be exercised in the configuration, placement and tilt angle of the flat plate solar collectors to maintain the constraints of vision from Independence Avenue or the Capitol.

The 2-high panels on the building roofs are indicated to be located on the Court side of the roof at a slope of 34°, which results in the maximum height of the solar collector supporting frame being 9'-0".

The 1-high panels on the building roofs on the outboard side are indicated to be installed at a slope of 24° which results in the maximum height of the solar collector supporting frame being 3'-3".

The 1-high panels on the penthouse roof are indicated to be installed away from the parapet at a slope of 29° which results in the maximum height of the solar collector supporting frame being 3'-10".

In each case, the solar collectors are installed facing south, away from Independence Avenue. Since the backs of the panel structures are proposed to be enclosed with a finish generally matching the building facade, the integrity of building architecture can be maintained.

B. Longworth House Office Building

Due to the limited roof area, only a 75 ft. long sloping roof facing the building court can be utilized for the installation of 50 - 34" x 76" flat plate solar collector panels in a 2-high configuration. This system can produce 155.8 x 10^6 Btu annually, or approximately 9.0% of the annual domestic water heating requirement. (See page 143)

Annual utility savings of $1,266 during initial year are expected, and over a 20 year period, based on projected rate increases, utility cost savings of $87,600 are anticipated. (See page 73)

The installation cost is estimated to be $70,700 (see page 72). This cost is computed to be amortized in 20.3 years when maintenance and repair costs are taken into account, and the installation is not deemed feasible. (See page 74)

C. Cannon Office Building

Due to the limited roof area, only a 150 ft. long sloping roof facing the building court can be utilized for the installation of 150 - 34" x 96" flat plate solar collector panels in a 3-high configuration. This system can produce 463.2 x 10^6 Btu annually, or approximately 28.5% of the annual domestic water heating requirement (see page 149). Annual utility savings of $3,764 during initial year are expected, and over a 20 year period, based on projected rate increases, utility cost savings of $260,300 are anticipated (see page 76).

The installation cost is estimated to be $149,700 (see page 75). This cost is computed to be amortized in 16.7 year period when maintenance and repair costs are taken into account (see page 77), and the installation is deemed feasible.

Three 2,000 gallon solar water storage tanks can be provided in the basement of the building.

Interconnecting piping between the solar panels and the basement storage tanks, heat exchanger and pumps can be installed in existing pipe shafts.

D. House Office Building Annex #2

A concentrating solar collector which tracks the sun is found to be feasible to provide 24.3% of the annual energy required for domestic water heating, heating for building radiation and partial building air conditioning.

An estimated breakdown of energy saved is as follows:

	Annual Requirement Btu x 10^6	Solar Energy Savings Btu x 10^6	Percent of Load
Domestic Water Heating	1,944.3	990.1	50.9%
Building Heating	8,647.0	1,126.0	13.0%
Building Air Conditioning	4,440.0	1,541.6	34.7%
Total Annual	15,031.3	3,657.7	24.3%

See pages 168 and 183 for breakdown of energy requirements.

See page 184 for total solar energy savings; allocations are made for each use based on monthly proportion of load.

Annual utility savings of $33,854 during initial year are expected (see page 92). Over a 20 year period, based on projected rate increases, utility cost savings of $2,341,700 are anticipated (see page 92).

In the design of the roof top solar collector system for the House Office Building Annex #2, full freedom is available for the installation, and as a result two and three high solar collectors are utilized with heights varying from 14 feet to 25 feet facing south with full view from Virginia Avenue and the Southwest Freeway.

Since the concentrating solar collectors track the sun, they will all be installed at a tilt angle of the latitude (39°).

Interconnecting piping between the solar panels and the basement equipment room will be collected at the top floor of the building and extended to the basement through existing pipe shafts.

Concentrating solar panel units (8 feet wide x 10 feet high) can be provided as follows for the House Office Building Annex #2:

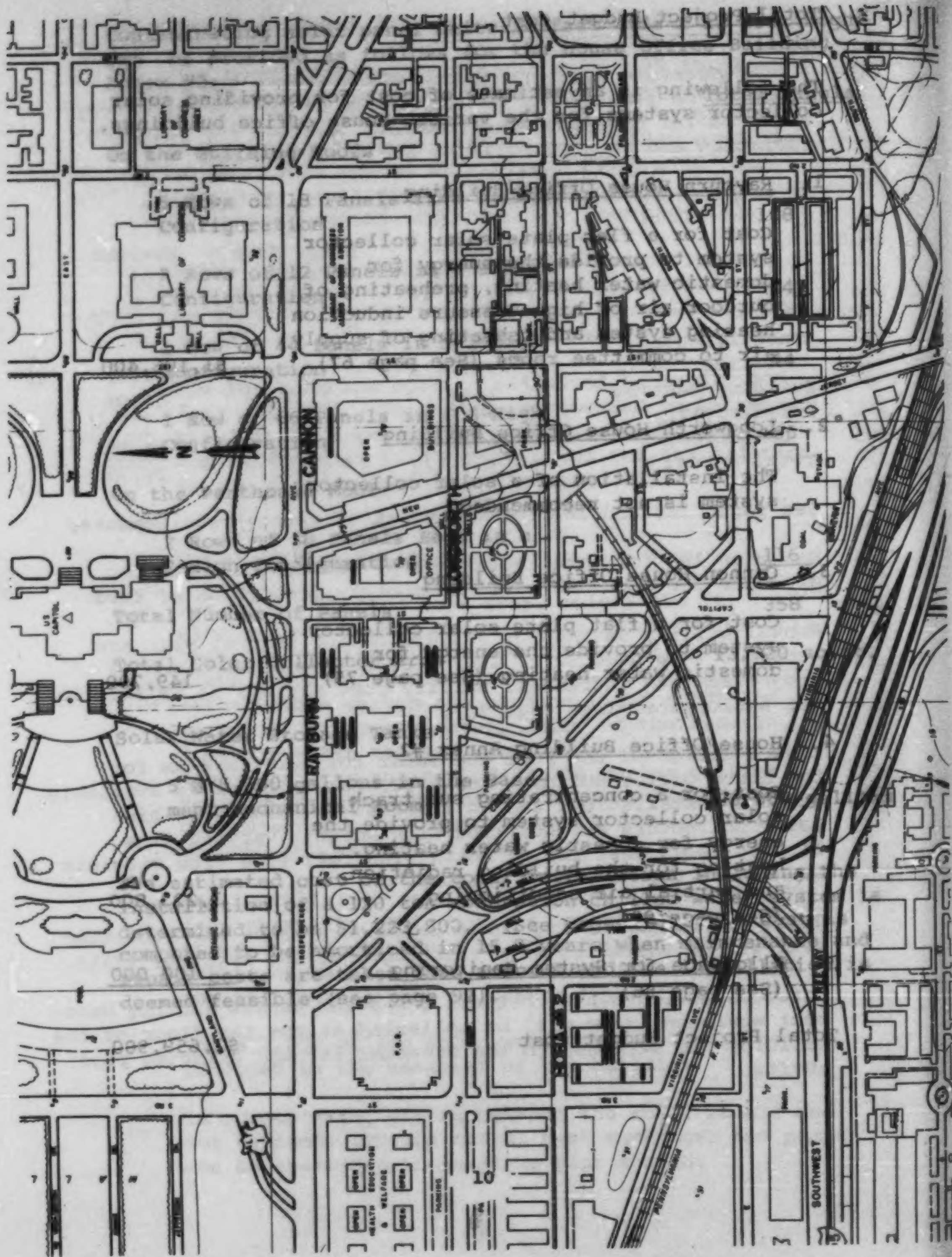
	Total Panels
On the Building Roofs	
6 Rows of 18 Panels in a 3-High Configuration	108
2 Rows of 12 Panels in a 2-High Configuration	24
1 Row of 44 Panels in a 2-High Configuration	44
1 Row of 66 Panels in a 3-High Configuration	66
On the Penthouse Roof	
2 Rows of 58 Panels Each in a 2-High Configuration	116
Total Number of Panels	358
Total Solar Collector Area	13,920 sq.ft.
Solar Water Storage Tanks	
5 @ 5,600 gallons in the Basement Mechanical Room	28,000 gallons

The estimated cost of the total installation including the installation of a 120 ton absorption chilled water system is determined to be $1,223,800. (See page 90) This cost is computed to be amortized in 15.8 years when maintenance and repair costs are taken into account and the installation is deemed feasible (see page 92).

E. Total Project Budget Cost

The following is an estimate of cost for providing solar collector systems for the various House office buildings.

1. **Rayburn House Office Building** Cost for a flat plate solar collector system to provide the energy for domestic water heating, preheating of outdoor air of high pressure induction heating system and reheating of supply air to committee rooms (See page 67)	$1,186,400
2. **Longworth House Office Building** The installation of a solar collector system is not recommended	---
3. **Cannon House Office Building** Cost for a flat plate solar collector system to provide the energy for domestic water heating (See page 75)	149,700
4. **House Office Building Annex #2** Cost for a concentrating sun track solar collector system to provide the energy for domestic water heating, heating for the building radiation, and partial air conditioning (See page 90)	1,223,800
5. **Allowance for System Monitoring** (See page 56)	100,000
Total Project Budget Cost	$2,659,900


LIBRARY OF CONGRESS
LIBRARY OF CONGRESS
CANNON
LONGWORTH
RAYBURN
U.S. CAPITOL
N
OPEN
OFFICE
BUILDINGS
INDEPENDENCE
HEALTH EDUCATION & WELFARE
OPEN
PARKING
SOUTHWEST
FREEWAY
VIRGINIA AVE
R.R.
CAPITOL
JERSEY
10

SECTION III

Discussion

III. Discussion

A. General Information

Solar collectors generally fall into two classifications.

Flat plate solar collectors are generally utilized to provide relatively low heat temperature of approximately 160°F. as would be required for domestic water heating or for building heating wherein building radiators, convectors or heating coils are designed to operate at such temperature.

Concentrating solar collectors are generally utilized to provide higher heat temperature in excess of 200°F. as would be required for absorption air conditioning chillers or for existing building heating systems designed to operate at 210°F. or greater, as is the case in most older buildings.

Flat plate solar collectors are usually installed in a fixed position and as a result it is necessary to not only face the collectors to the south, but to tilt them at an angle where the greatest solar energy can be collected. For year round operation as is required for domestic water heating, the optimum tilt angle is approximately the latitude of the area. For solar energy collection required for building heating only, the optimum tilt angle approximates 10° greater than the latitude in order to obtain maximum advantage of the low winter sun. For cooling only, the optimum tilt angle approximates 10° less than the latitude. Where combinations of domestic water heating, building heating, or air conditioning occur, analysis is required on an annual basis to determine the tilt angle which produces the greatest solar collection.

Flat plate solar collectors absorb solar energy from three basic components: beam radiation which is that part of the solar radiation which casts shadows, diffused radiation which is that part of solar radiation which is scattered by clouds and dust before it reaches the ground and which does not cast shadows, and reflected radiation which comes from the ground and surroundings.

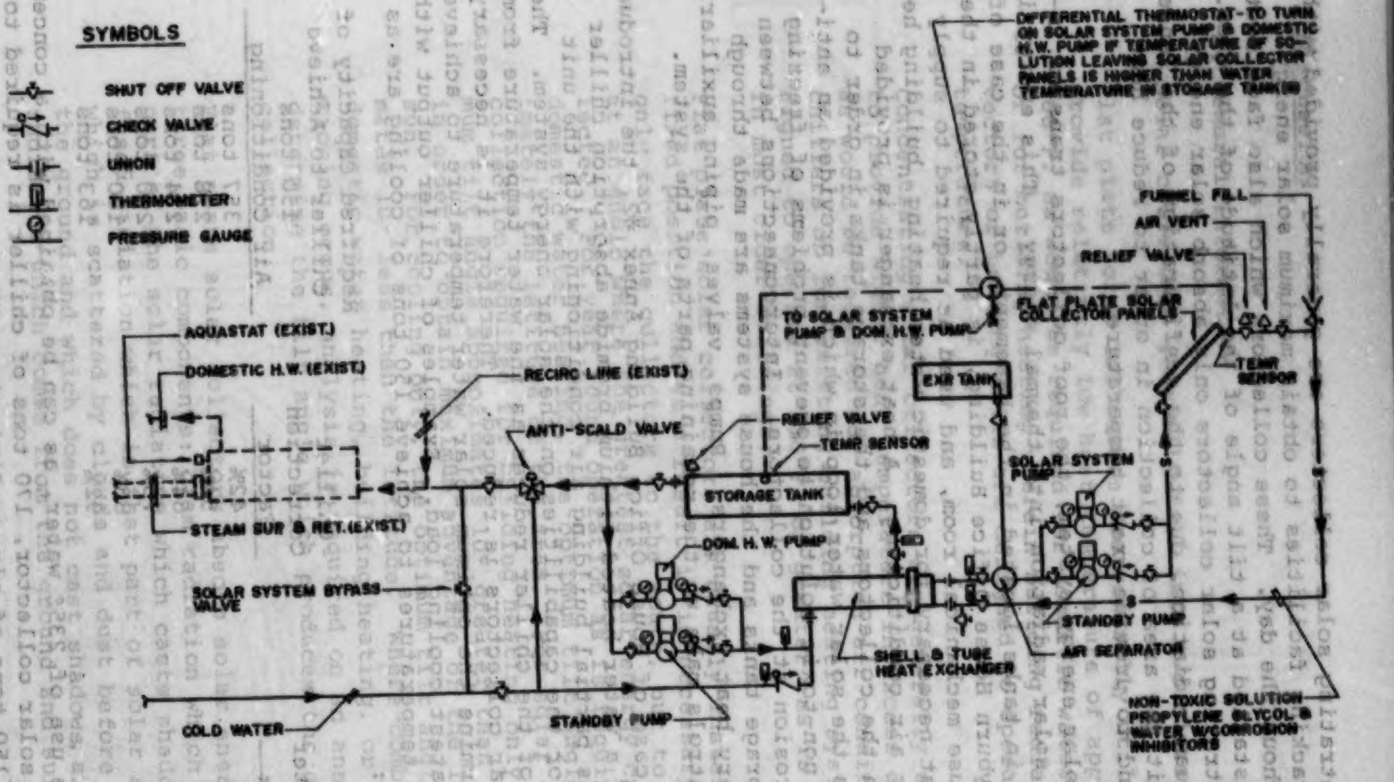
Concentrating solar collectors are generally provided with sun tracking facilities to obtain maximum solar energy throughout the day. These collectors which also face south are installed at a tilt angle of the latitude of the area. Concentrating solar collectors only absorb solar energy from beam radiation, due to the configuration of the lenses to limit the area of collection in order to reduce heat loss and to provide great temperature.

In a solar energy system, the roof collectors transfer incident solar radiation into thermal energy. This energy is stored in tanks located in the basement, or in the case of the Rayburn House Office Building, is partly stored in the penthouse mechanical room, and used as required to supply the heat necessary for domestic water heating, building heating, or air conditioning. A heat exchanger is provided between the collectors and the storage tanks in order to isolate the solar water loop in which is provided an antifreeze non-toxic solution to prevent problems of freezing or corrosion at the collectors. Interconnections between the storage tanks and the house systems are made through secondary heat exchangers. Pumps, valves, piping auxiliaries and controls make up the remaining parts of the system.

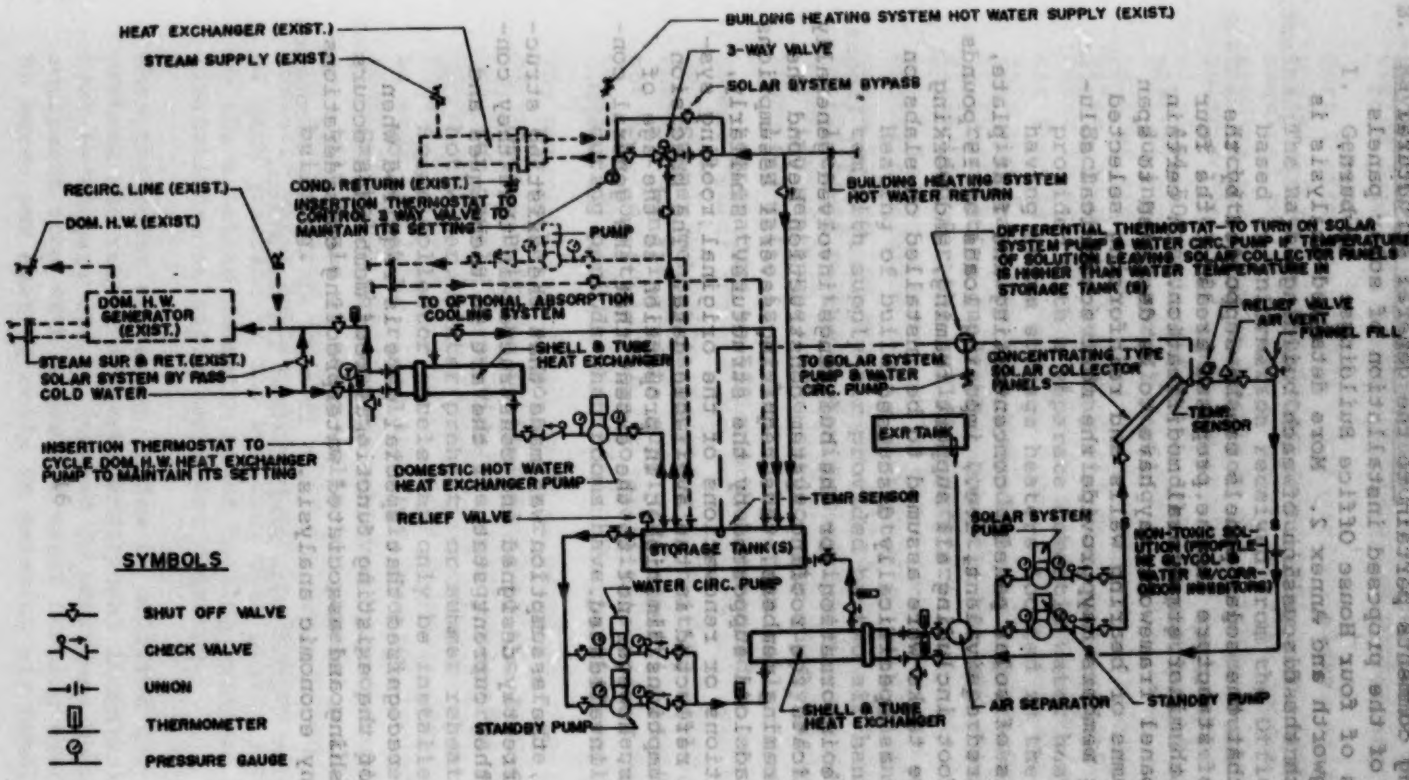
In the case of House Office Building Annex #2, the introduction of a water heated lithium bromide absorption chiller provides partial building air conditioning with the unit sized for the capabilities on the solar energy system. The output of the chiller reduces as the water temperature from the solar collectors is reduced. Therefore it is necessary to determine the optimum solar water temperature to achieve the greatest cooling load. Examples of chiller output with varying temperatures to achieve 150 tons of cooling are as follows:

Site Water Temp °F.	Chiller Correction Factor	Required Capacity of Chiller to Achieve 150 tons Air Conditioning
190°	42%	357 tons
200°	54%	278 tons
210°	64%	234 tons
220°	75%	200 tons
230°	83%	180 tons
240°	92%	163 tons

With the use of 235° water, as can be obtained with a concentrating solar collector, 170 tons of chiller is required to produce 150 tons of air conditioning. The cooling tower for this selection can be located on the roof over the chiller to achieve maximum performance.


DIFFERENTIAL THERMOSTAT-TO TURN ON SOLAR SYSTEM PUMP & DOMESTIC H.W. PUMP IF TEMPERATURE OF SOLUTION LEAVING SOLAR COLLECTOR PANELS IS HIGHER THAN WATER TEMPERATURE IN STORAGE TANK(S)
FUNNEL FILL
AIR VENT
RELIEF VALVE
FLAT PLATE SOLAR COLLECTOR PANELS
TEMP. SENSOR
TO SOLAR SYSTEM PUMP & DOM. H.W. PUMP
EXP. TANK
SOLAR SYSTEM PUMP
STANDBY PUMP
AIR SEPARATOR
NON-TOXIC SOLUTION PROPYLENE GLYCOL & WATER W/CORROSION INHIBITORS
SHELL & TUBE HEAT EXCHANGER
RELIEF VALVE
TEMP. SENSOR
STORAGE TANK
DOM. H.W. PUMP
STANDBY PUMP
ANTI-SCALD VALVE
RECIRC LINE (EXIST.)
AQUASTAT (EXIST.)
DOMESTIC H.W. (EXIST.)
STEAM SUP. & RET. (EXIST.)
SOLAR SYSTEM BYPASS VALVE
COLD WATER
SYMBOLS
SHUT OFF VALVE
CHECK VALVE
UNION
THERMOMETER
PRESSURE GAUGE

SOLAR DOMESTIC HOT WATER HEATING SYSTEM FLOW DIAGRAM


HEAT EXCHANGER (EXIST.)
STEAM SUPPLY (EXIST.)
BUILDING HEATING SYSTEM HOT WATER SUPPLY (EXIST.)
3-WAY VALVE
SOLAR SYSTEM BYPASS
BUILDING HEATING SYSTEM HOT WATER RETURN
RECIRC. LINE (EXIST.)
DOM. H.W. (EXIST.)
COND. RETURN (EXIST.)
INSERTION THERMOSTAT TO CONTROL 3 WAY VALVE TO MAINTAIN ITS SETTING
PUMP
DIFFERENTIAL THERMOSTAT—TO TURN ON SOLAR SYSTEM PUMP & WATER CIRC. PUMP IF TEMPERATURE OF SOLUTION LEAVING SOLAR COLLECTOR PANELS IS HIGHER THAN WATER TEMPERATURE IN STORAGE TANK (S)
DOM. H.W. GENERATOR (EXIST.)
TO OPTIONAL ABSORPTION COOLING SYSTEM
RELIEF VALVE
AIR VENT
FUNNEL FILL
STEAM SUP. & RET. (EXIST.)
SOLAR SYSTEM BY PASS
COLD WATER
SHELL & TUBE HEAT EXCHANGER
TO SOLAR SYSTEM PUMP & WATER CIRC. PUMP
CONCENTRATING TYPE SOLAR COLLECTOR PANELS
TEMP. SENSOR
EXP. TANK
INSERTION THERMOSTAT TO CYCLE DOM. H.W. HEAT EXCHANGER PUMP TO MAINTAIN ITS SETTING
DOMESTIC HOT WATER HEAT EXCHANGER PUMP
TEMP. SENSOR
RELIEF VALVE
SOLAR SYSTEM PUMP
NON-TOXIC SOLUTION (PROPYLENE GLYCOL & WATER W/CORROSION INHIBITORS)
STORAGE TANK (S)
WATER CIRC. PUMP
STANDBY PUMP
SHELL & TUBE HEAT EXCHANGER
AIR SEPARATOR
STANDBY PUMP
SYMBOLS
SHUT OFF VALVE
CHECK VALVE
UNION
THERMOMETER
PRESSURE GAUGE

SOLAR SYSTEM FLOW DIAGRAM FOR DOMESTIC HOT WATER, BUILDING HEATING AND OPTIONAL BUILDING COOLING

The following comments pertain to the general structural feasibility of the proposed installation of solar panels on the roofs of four House Office Buildings: Rayburn, Cannon, Longworth and Annex 2. More detailed analysis is provided with the discussion of each building.

It appears that the solar panels can be supported by the existing roof structure in the proposed areas of the four buildings with minor structural modification. In certain cases, the panel framework may have to be designed to span between columns or bearing walls and reinforcing selected roof support members may provide the most economical solution.

The two types of solar panels, concentrating and flat plate, were considered equivalent, i.e., imposing loads of 15 pounds per square foot including all support framing, and working fluid storage tanks were assumed to be installed on slabs on grade except as specifically discussed.

The available information for the buildings involved generally does not indicate the roofing system construction beyond the structural framing members, thus requiring several assumptions as to the dead load supported by the structure. Similarly, any modifications or renovations of the original roofing systems are not reflected in the available data. The precision of these assumptions diminishes in proportion to the age of the buildings, however not to the extent that the general conclusions are invalidated.

Additionally, the assumption was made that the existing structures are correctly designed and constructed in that they conform to the then current state of the art in techniques and materials.

It should be recognized that special care is required when penetration of the existing functional roof membranes occurs and that flashing and associated waterproofing considerations may affect any economic analysis.

B. Rayburn House Office Building

1. General

The Rayburn House Office Building solar energy study, based on information received from the Office of the Architect of the Capitol, has a gross building area of 1,161,826 square feet, a net assignable area of 454,500 square feet, and has a population of 4,000 during the normal working day.

Each of the building wings or quadrants is presently provided with a separate domestic water heating system having steam storage heaters located in the basement with capacity to accommodate the requirements of the respective quadrant. Domestic hot water is also provided for the building cafeteria.

Heating of building perimeter is with an induction system with supply air provided by two air handling units located in the mechanical equipment room of the building penthouse. The outdoor air supply of the air handling units is preheated by steam coils from the outdoor temperature to 55° and then reheated to zone requirements.

Summer reheat is provided by heating coils in fourteen air handling units supplying conditioned air to each of the committee rooms to facilitate space environment during periods when rooms have partial cooling loads.

For esthetic reasons, the roof area of the Rayburn House Office Building is limited as to the use of solar collector panels to provide the energy required for domestic hot water, winter preheat, or summer reheat requirements. Solar collector panels can only be installed where they would not be readily visible from the street or from the Capitol. This can be achieved by proper placement and tilt angle of solar collector panels on the roof of the building.

In order to satisfy the restraint of vision, solar collector panels can be installed on the following roof areas:

a. On the south side of the north wings of each quadrant.

b. On the north side of the south wings of each quadrant.

c. On sloping roof facing the court of the building.

d. In other locations of the wings or mechanical equipment penthouse, only if the tilt angle of the solar collectors approaches the horizontal.

The solar collector panels will all face south and the structural supporting system will have to be enclosed on the back or north side to generally match the building facade, but not necessarily of the same material.

At each of the four wings, there is available 150 linear feet of roof for the installation of one or two rows of solar collector panels.

Additional roof space is available as follows:

Penthouse sloping roof facing building court - 150 linear feet.

Two penthouse roof areas, each 150 feet in length.

The analyses take the various roof areas into account in order to arrive at the most economical solar collector system to provide domestic water heating and a portion of the building winter preheat and summer reheat.

Since there is no available location for the installation of a cooling tower as would be required with an air conditioning system, no analysis is made as to the economics of a solar assist air conditioning installation.

The economic and engineering analyses for the Rayburn House Office Building are divided into two parts.

Part I provides analyses for various sizes, areas and tilt angles of flat plate solar collectors to provide the energy required to heat domestic water for each quadrant. Detailed studies are made to determine the optimum tilt angle of each solar collector system analyzed.

Part II provides analyses of flat plate solar collectors of various areas to provide the energy required to heat domestic water, to preheat outdoor air supplied to the building perimeter induction units during winter operation and to reheat air supplied to committee rooms during summer light room loads. This would enable year round use of the solar collector system at relatively low temperature and therefore at high collector efficiency.

Winter preheating can be accomplished by the addition of water coils having hot water with anti-freeze. The new coils would be installed upstream of the existing non-freeze steam coils, which could then be utilized for supplemental load during extreme days.

Summer reheat for cooling duty can be achieved by the introduction of hot water coils upstream of existing steam coils, wherein all the excess solar energy not utilized for domestic hot water is available for reheat, thus increasing annual total solar energy collection.

The program as outlined would be novel in that it makes use of year round solar energy for uses which apparently have not been provided in past demonstrations. Monitoring and measurements of this system could substantially contribute to solar energy technology where valuable design data could be made available. The analysis does not include detailed costs for such monitoring.

The solar system storage tanks and heat exchangers for the domestic water heating system can be located in the basement of each quadrant of the building with piping interconnected to the existing domestic water heating systems. Due to space limitations, multiple tanks are required.

When the solar collector system is utilized for building preheat and reheat systems, additional storage tanks and heat exchangers can be located in penthouse mechanical equipment room with a new hot water heating system installed to serve new heating coils in existing air handling units.

2. Part I Analysis of Domestic Water Heating with Flat Plate Solar Collectors

a) Under consideration per building quadrant are the following:

(1) The use of one row of 100 panels in a 2-high configuration on a tilted supporting structure 150 feet in length

(a) Panel Size - 34" wide x 76" high
Collector Area - 1,724 sq.ft.

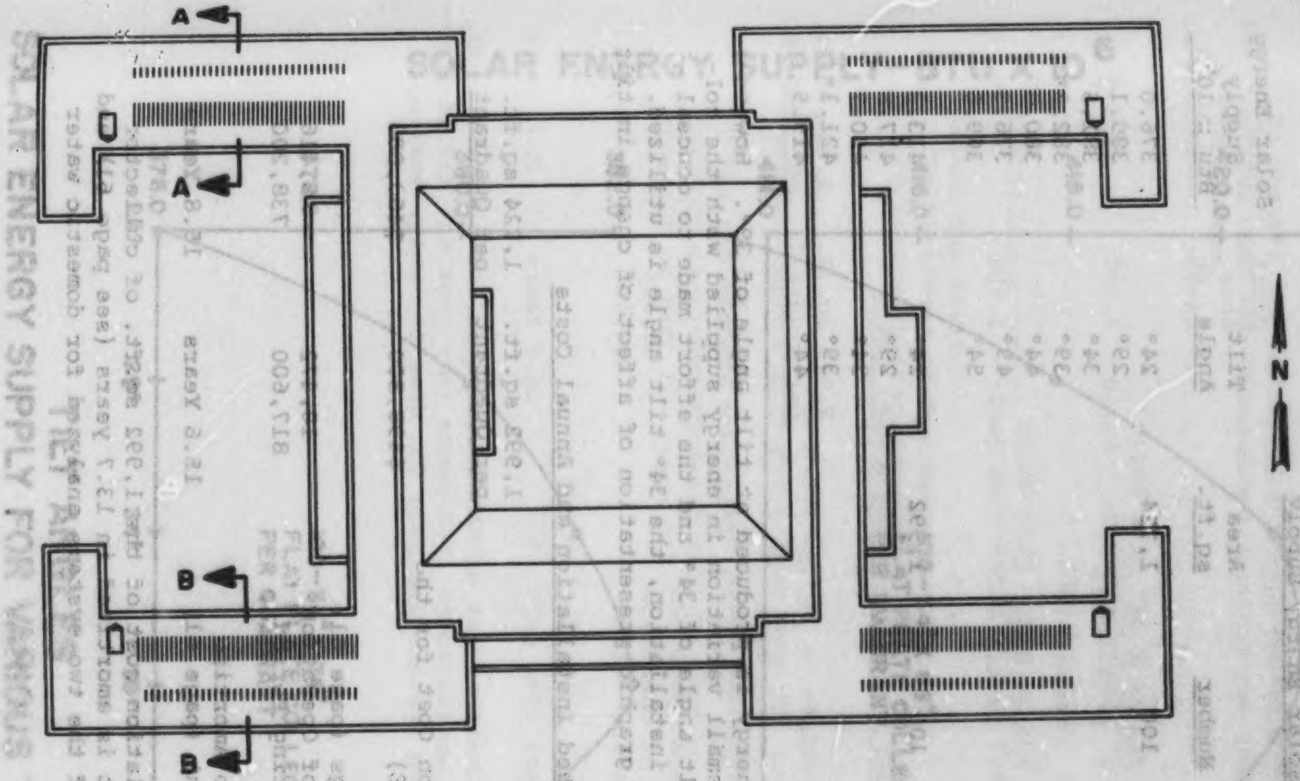
(b) Panel Size - 34" wide x 96" high
Collector Area - 1,992 sq.ft.

(2) Installation of two parallel rows of panels on tilted supporting structures 150 feet in length; one row in a 2-high configuration at a tilt angle of 34° and one row in a 1-high configuration at a tilt angle of 24°.

(a) 150 - 34" wide x 76" high
Collector Area - 2,586 sq.ft.

(b) 150 - 34" wide x 96" high
Collector Area - 2,988 sq.ft.

See page 20 for roof plan of the Rayburn House Office Building for proposed location of solar panels under consideration. See page 30 for roof sections at building quadrants.



FLAT PLATE SOLAR COLLECTOR PANELS FOR DOMESTIC HOT WATER.

▮▮▮▮ – 100 - 34"x 96" (2-HIGH) AT 34° TILT ANGLE

|||||||| – 50 - 34"x 96" (1-HIGH) AT 24° TILT ANGLE

TOTAL – 150 PANELS PER QUADRANT 2988 SQ. FT.

RAYBURN HOUSE OFFICE BUILDING - ROOF PLAN

SCALE: 1"=100'-0"

b) Summary of Energy Supplied for Domestic Water Heating by Single Rows of Flat Plate Solar Collectors per Quadrant

(1) Annual Solar Energy Supply

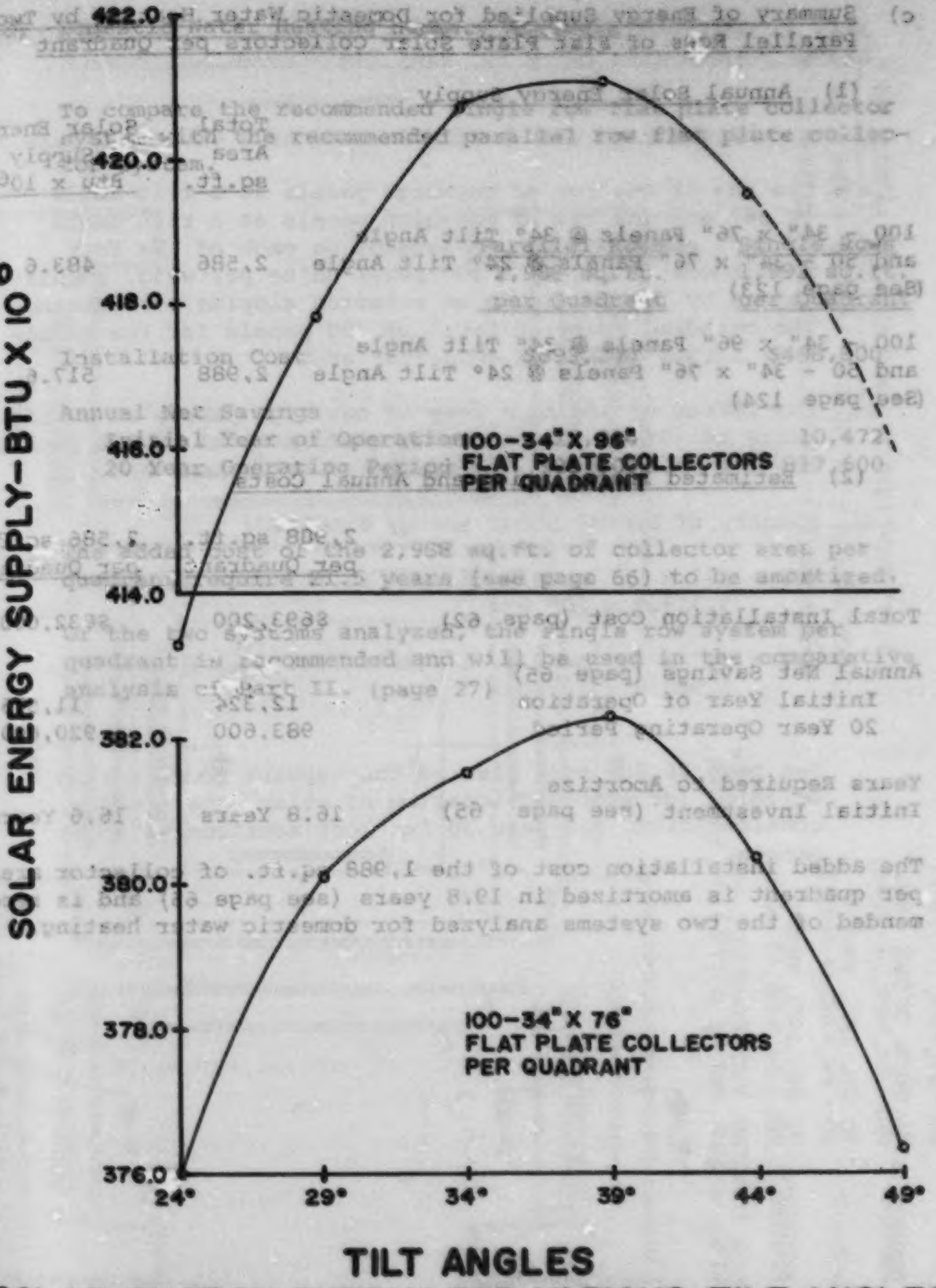
Panel Size	Number	Area sq.ft.	Tilt Angle	Solar Energy Supply Btu x 10^6
34" x 76" (See pages 107 to 113)	100	1,724	24°	376.0
			29°	380.1
			34°	381.5
			39°	382.3*
			44°	380.3
			49°	376.3
			54°	369.6
34" x 96" (See pages 116 to 120)	100	1,992	24°	413.3
			29°	417.8
			34°	420.7
			39°	421.1*
			44°	419.5

*Maximum solar energy is produced at tilt angle of 39°. However, because of the small variation in energy supplied with the collectors at a tilt angle of 34° and the effort made to conceal the solar panel installation, the 34° tilt angle is utilized. See page 22 for graphic presentation of affect of change in tilt angle.

(2) Estimated Installation and Annual Costs

	1,992 sq.ft. per Quadrant	1,724 sq.ft. per Quadrant
Total Installation Cost for the Building (page 58)	$498,800	$460,000
Annual Net Savings (page 61)		
Initial Year of Operation	10,472	9,416
20 Year Operating Period	817,600	738,200
Years Required to Amortize Initial Investment (page 61)	15.6 Years	15.8 Years

The added installation cost of the 1,992 sq.ft. of collector area per quadrant is amortized in 13.7 years (see page 61) and is recommended of the two systems analyzed for domestic water heating.



SOLAR ENERGY SUPPLY FOR VARIOUS TILT ANGLES
DOMESTIC WATER HEATING
RAYBURN HOUSE OFFICE BUILDING

c) Summary of Energy Supplied for Domestic Water Heating by Two Parallel Rows of Flat Plate Solar Collectors per Quadrant

(1) Annual Solar Energy Supply

	Total Area sq.ft.	Solar Energy Supply Btu x 10^6
100 - 34" x 76" Panels @ 34° Tilt Angle and 50 - 34" x 76" Panels @ 24° Tilt Angle (See page 123)	2,586	483.6
100 - 34" x 96" Panels @ 34° Tilt Angle and 50 - 34" x 76" Panels @ 24° Tilt Angle (See page 124)	2,988	517.6

(2) Estimated Installation and Annual Costs

	2,988 sq.ft. per Quadrant	2,586 sq.ft. per Quadrant
Total Installation Cost (page 62)	$693,200	$632,000
Annual Net Savings (page 65)		
Initial Year of Operation	12,324	11,576
20 Year Operating Period	983,600	920,600
Years Required to Amortize Initial Investment (see page 65)	16.8 Years	16.6 Years

The added installation cost of the 1,988 sq.ft. of collector area per quadrant is amortized in 19.8 years (see page 65) and is reccomended of the two systems analyzed for domestic water heating.

d) Domestic Water Heating Summary Analysis

To compare the recommended single row flat plate collector system with the recommended parallel row flat plate collector system.

	Parallel Rows 2,988 sq.ft. per Quadrant	Single Rows 1,992 sq.ft. per Quadrant
Installation Cost	$693,200	$498,800
Annual Net Savings		
Initial Year of Operation	12,324	10,472
20 Year Operating Period	983,600	817,600

The added cost of the 2,988 sq.ft. of collector area per quadrant require 21.5 years (see page 66) to be amortized.

Of the two systems analyzed, the single row system per quadrant is recommended and will be used in the comparative analysis of Part II. (page 27)

3. Part II Analysis of Domestic Water Heating, Winter Preheating and Summer Reheat with 34" x 96" Flat Plate Solar Collectors

Under consideration with available roof area are the following:

a) The use of one row of two-high panels at a tilt angle of 34° and one row of one-high panels at a tilt angle of 24°, each 150 feet in length, on each of the four wing roofs; a total of 150 panel units per wing, supplemented by 100 panels in an existing sloping roof facing the building court; a total of 700 panels for the building; 13,944 sq.ft. of collector area.

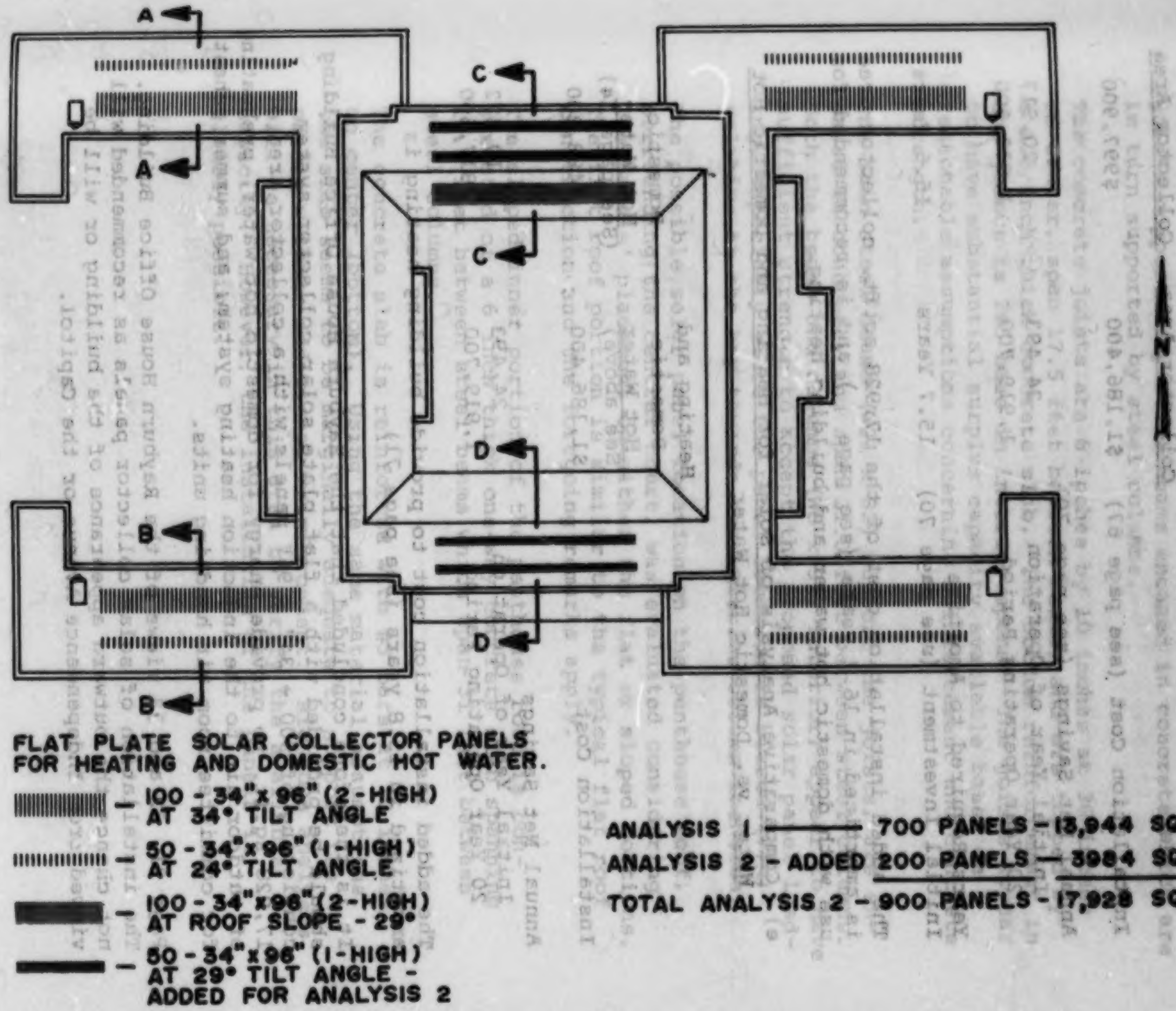
b) The affect of adding 4 rows of one-high panels at a tilt angle of 29° on the penthouse roof; a total of 900 panels for the building; 17,928 sq.ft. of collector area.

c) Summary of Annual Solar Energy Supplied:

700 - 34" x 96" panels, 13,944 sq.ft. (see page 135), $3,356.2 \times 10^6$ Btu

900 - 34" x 96" panels, 17,928 sq.ft. (see page 137), $3,961.8 \times 10^6$ Btu

See page 26 for roof plan of the Rayburn House Office Building for proposed location of solar panels under consideration. See page 30 for roof sections at solar panels.


A
A
B
B
C
C
D
D
N
FLAT PLATE SOLAR COLLECTOR PANELS FOR HEATING AND DOMESTIC HOT WATER.
▥ – 100 - 34"x 96" (2-HIGH) AT 34° TILT ANGLE
▥ – 50 - 34"x 96" (1-HIGH) AT 24° TILT ANGLE
■ – 100 - 34"x 96" (2-HIGH) AT ROOF SLOPE - 29°
▬ – 50 - 34"x 96" (1-HIGH) AT 29° TILT ANGLE - ADDED FOR ANALYSIS 2

ANALYSIS 1 ——— 700 PANELS - 13,944 SQ. FT.
ANALYSIS 2 - ADDED 200 PANELS — 3984 SQ. FT.
TOTAL ANALYSIS 2 - 900 PANELS - 17,928 SQ. FT.

RAYBURN HOUSE OFFICE BUILDING - ROOF PLAN

SCALE: 1"=100'-0"

d) Estimated Installation and Annual Costs

	17,928 sq.ft. Collector Area	13,944 sq.ft. Collector Area
Installation Cost (see page 67)	$1,186,400	$997,900
Annual Net Savings (see page 70)		
Initial Year of Operation	24,493	20,917
20 Year Operating Period	1,919,700	1,633,300
Years Required to Amortize Initial Investment (see page 70)	15.7 Years	15.6 Years

The added installation cost of the 17,928 sq.ft. collector area is amortized in 16.7 years (see page) and is recommended for use with domestic hot water and building heating.

e) Comparative Analysis of Solar for Heating and Domestic Hot Water vs. Domestic Hot Water

	Heating and Domestic Hot Water (See above)	Domestic Hot Water (See page 24)
Installation Cost	$1,186,400	$498,800
Annual Net Savings		
Initial Year of Operation	24,493	10,472
20 Year Operating Period	1,919,700	817,600

The added installation cost to provide building heating is amortized in 15.8 years (see page 71).

It is therefore concluded that the Rayburn House Office Building should be provided with a flat plate solar collector system consisting of 900 - 34" x 96" panels with a collector area of 17,928 sq.ft. to provide energy for domestic hot water, preheating of outdoor air to the induction heating system, and summer reheat for committee room air handling units.

Page 31, 32 and 33 views of the Rayburn House Office Building. The installation of solar collector panels as recommended will not change the outward appearance of the building or will be viewed from Independence Avenue or the Capitol.

4. **Structural**

The roof construction of the quadrant wing roofs is concrete joists supported by steel beams encased in concrete which are in turn supported by steel columns.

The concrete joists are 6 inches by 10 inches at 36 inches on center, span 17.5 feet between beams, and are topped by a 2.5 inch thick concrete slab. The bottom reinforcement in the joists is 2#5 bars in interior spans. The joists appear to have substantial surplus capacity available based on reasonable assumptions concerning reinforcement and concrete strength.

The main steel beams (W21 x 82) support the joists, are encased in concrete, and span 31.0 feet between steel columns. Both the beams and columns (W8 x 31, interior) appear to have sufficient strength to accept the proposed solar panel loading, especially since the panel location is biased (77%) relative to the bay towards the interior column location.

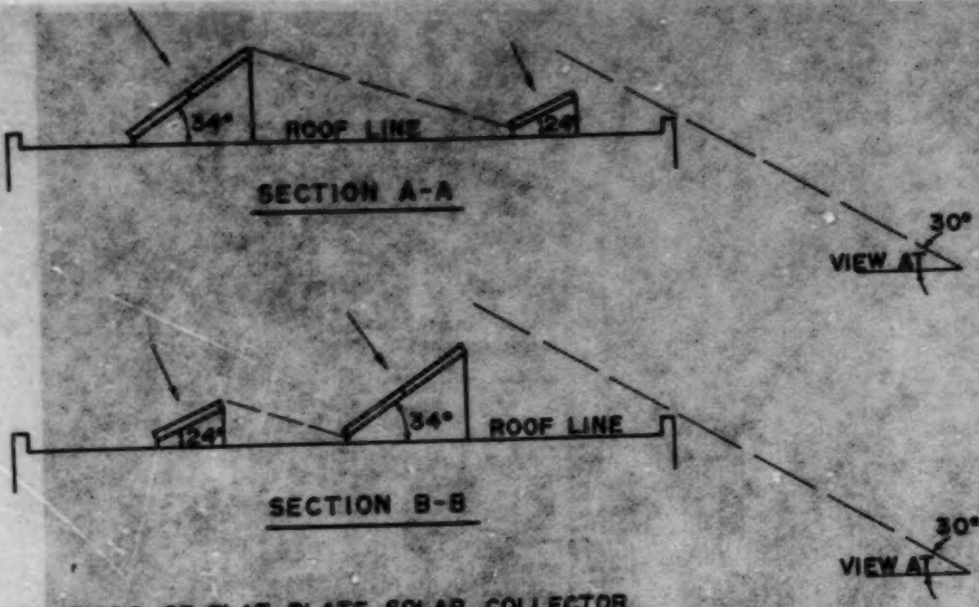
The possible solar panel location on the penthouse roof, surrounding the central court, was evaluated considering the panels' placement on either the flat or sloped portions. The flat roof portion is similar to the typical flat roof construction and the foregoing remarks apply.

The sloped inner portion of the penthouse roof is constructed of a 6 inch thick one-way concrete slab spanning 17.5 feet between steel beams which span 31 feet between steel columns.

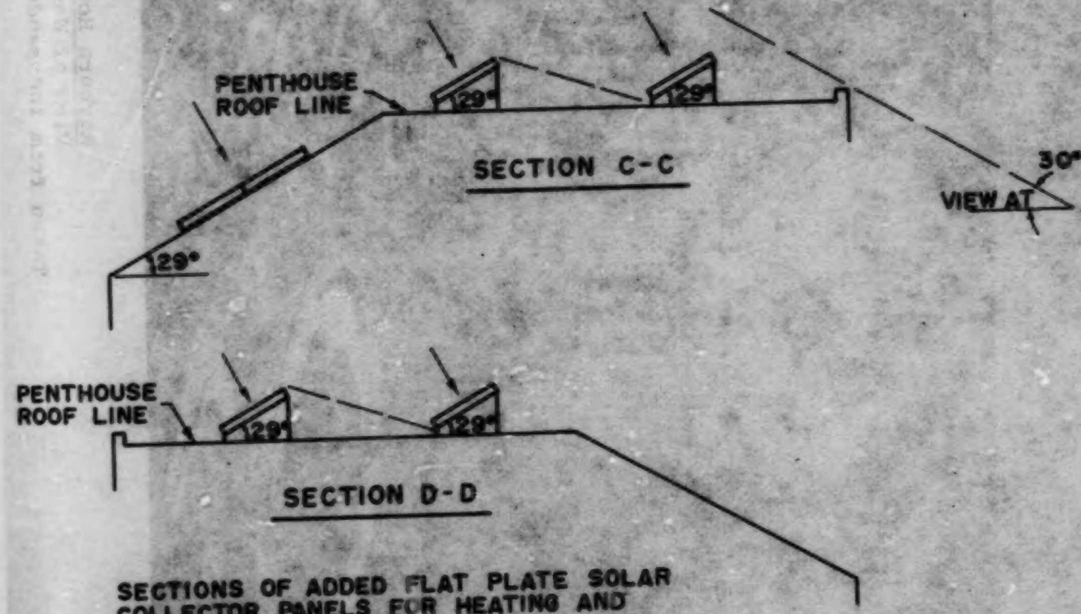
The concrete slab is reinforced with #5 bars at 10 inches on center (bottom). Using the same material assumptions, the slab seems to be marginally adequate to support the panels without additional reinforcement. Rigorous analysis will be necessary in this area to verify the available capacity. However, the installation of the panels is clearly possible.

d) Although the available information does not indicate the condition, it seems reasonable to assume the steel beam, W21x82, is encased in concrete in this sloping roof area and will prove satisfactory to support the proposed additional loading.

The proposed installation of storage tanks in the mechanical equipment room at the penthouse was considered assuming a 7 foot diameter cylindrical tank. Reportedly, the design live load capacity of the mechanical equipment room floor is 100 pounds per square foot. This indicates that a 27 foot or greater width strip of floor would be required to support the tanks, for the length of the tanks. Distributing the tanks' weight across the floor with steel cribbing does not seem to be feasible considering the present equipment layout. The alternative of reinforcing the existing floor members to support the excess loads will be constrained by accessibility and may not be practical. The alternative of installing steel framing within the mechanical room below the roof and suspending the tanks from tension hangers appears to be the most practical and economical approach to this problem.


34°
ROOF LINE
24°
SECTION A-A
30°
VIEW AT
24°
34°
ROOF LINE
SECTION B-B
30°
VIEW AT

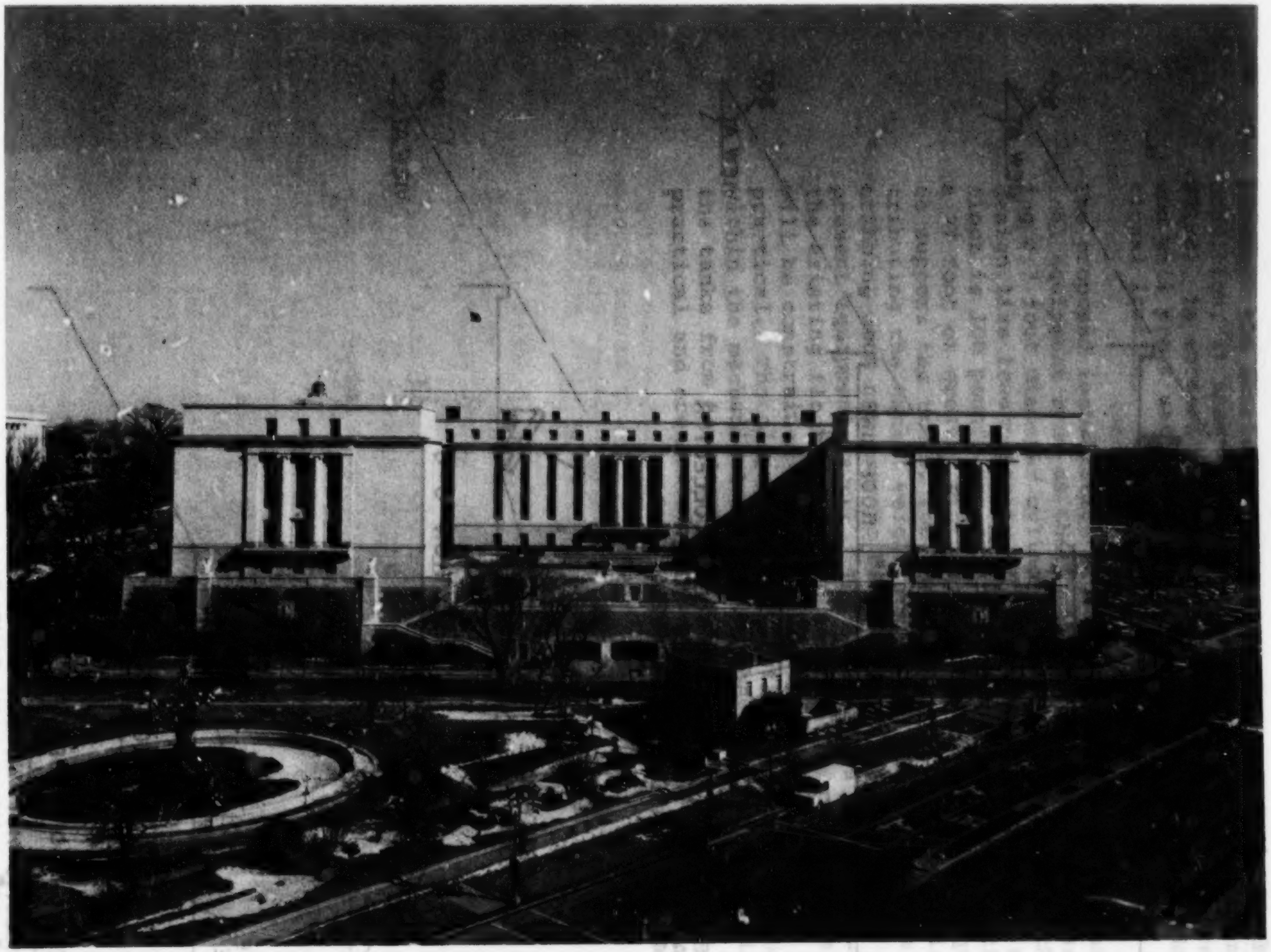
SECTIONS OF FLAT PLATE SOLAR COLLECTOR PANELS FOR DOMESTIC HOT WATER 34"x 96" - 1 AND 2 HIGH PANELS


PENTHOUSE ROOF LINE
29°
29°
SECTION C-C
30°
VIEW AT
29°
PENTHOUSE ROOF LINE
29°
29°
SECTION D-D

SECTIONS OF ADDED FLAT PLATE SOLAR COLLECTOR PANELS FOR HEATING AND DOMESTIC HOT WATER 34"x 96" - 1 AND 2 HIGH PANELS

RAYBURN HOUSE OFFICE BUILDING ROOF SECTIONS

SCALE: 1/16" = 1'-0"



Rayburn House Office Building
View of West Side of Building
Taken from Independence Avenue and Third Street

Rayburn House Office Building
View of North Side of Building
Taken from the Capitol

Rayburn House Office Building
View of Inner Court Facing North

C. Longworth House Office Building

1. General

The Longworth House Office Building solar energy study, based on information received from the Office of the Architect of the Capitol, has a gross building area of 565,412 square feet, a net assignable area of 306,122 square feet, and has a population of 2,700 during the normal working day.

Due to esthetic and architectural restraints of the sloping roofs of the building, the space available for the installation of solar collector panels is limited.

The only available roof area for the use of the solar collector panel installation is a 75 foot long sloping roof facing south to the building court at a slope of 34°.

A 2-high row of 34" x 76" flat plate solar collector panels can be installed to provide a total of 50 panels having a total collector area of 862 square feet which can only accommodate the partial domestic hot water requirements of the building.

The solar system storage tank and heat exchanger for the domestic water system can be located in the basement with piping interconnected to the existing domestic water heating system.

The installation of such a solar collector system can produce annually 155.8 x 10^6 Btu for domestic water heating (see page 143)

The estimated installation cost of the solar collector system is $70,700 (see page 72). The estimated net first year savings is $808 and the estimated net 20 year savings is $69,300 (see page 74)

It will take 20.3 years to amortize the initial installation cost. It is therefore concluded that the use of the solar collector system is not feasible.

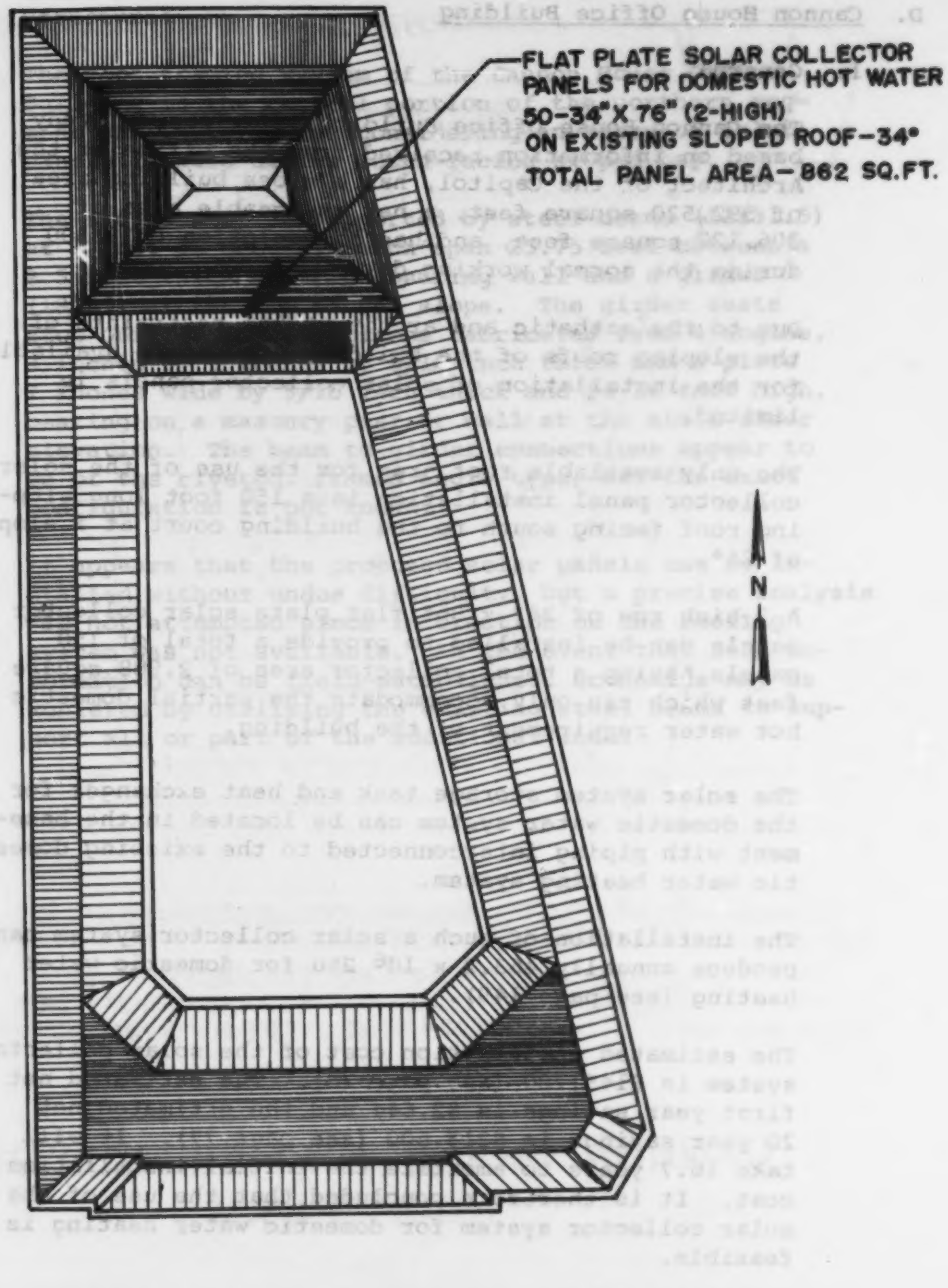
2. Structural

The general construction of the roof of the Longworth House Office Building is open web steel trusses fabricated from double angle members and spanning between steel columns. The proposed solar panel location on the south-facing sloped portion of the roof on the northern segment of the building is framed with T-4 type trusses at an average of 20 feet on center. The trusses span 22 feet and support 16B40 beams at 8 feet on center.

The structural steel reportedly conforms to ASTM specification A9-24 with an allowable working stress of 18,000 pounds per square inch. The roof was reportedly designed for a live loading of 30 pounds per square foot.

The installation of the proposed solar panels appears to present no major problems on this structure. The existing steel columns seem to have substantial excess capacity, thus eliminating the need for reinforcement. Utilizing the existing trusses for partial or complete support of the solar panels may be feasible as well, which would result in savings in the design of the solar panel support system. This approach will be dependent, in part, on the actual capacity of the riveted connections in the trusses and between the trusses and columns which will not be established until field investigations have been conducted.

It should be noted that there appears to be a dormer-like protrusion from the sloped roof in the vicinity of the proposed solar panels. This assembly is not shown on the original structural drawings and may impede access to roof trusses which could be used for solar panel support.


FLAT PLATE SOLAR COLLECTOR PANELS FOR DOMESTIC HOT WATER
50-34" X 76" (2-HIGH)
ON EXISTING SLOPED ROOF-34°
TOTAL PANEL AREA-862 SQ.FT.
N

LONGWORTH HOUSE OFFICE BUILDING
ROOF PLAN

SCALE: 1" = 50'-0"

D. Cannon House Office Building

1. General

The Cannon House Office Building solar energy study, based on information received from the Office of the Architect of the Capitol, has a gross building area of 592,520 square feet, a net assignable area of 306,122 square feet, and has a population of 2,500 during the normal working day.

Due to the esthetic and architectural restraints of the sloping roofs of the building, the space available for the installation of solar collector panels is limited.

The only available roof area for the use of the solar collector panel installation is a 150 foot long sloping roof facing south to the building court at a slope of 24°.

A 3-high row of 34" x 96" flat plate solar collector panels can be installed to provide a total of 150 panels having a total collector area of 2,988 square feet which can only accommodate the partial domestic hot water requirement of the building.

The solar system storage tank and heat exchanger for the domestic water system can be located in the basement with piping interconnected to the existing domestic water heating system.

The installation of such a solar collector system can produce annually 463.2 x 10^6 Btu for domestic water heating (see page 149).

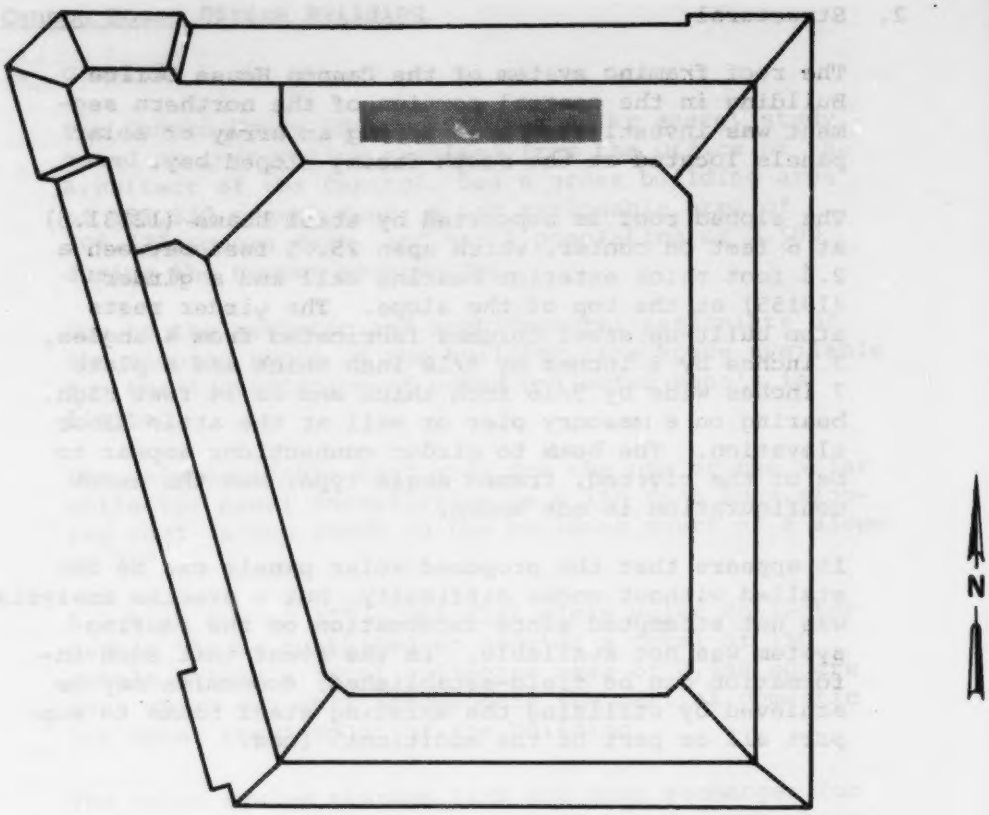
The estimated installation cost of the solar collector system is $149,700 (see page 75). The estimated net first year savings is $2,644 and the estimated net 20 year savings is $215,500 (see page 77). It will take 16.7 years to amortize the initial installation cost. It is therefore concluded that the use of the solar collector system for domestic water heating is feasible.

2. Structural

The roof framing system of the Cannon House Office Building in the central portion of the northern segment was investigated considering an array of solar panels located at the South-facing sloped bay.

The sloped roof is supported by steel beams (12I31.5) at 6 feet on center, which span 25.75 feet between a 2.5 foot thick exterior bearing wall and a girder (18I55) at the top of the slope. The girder rests atop built-up steel columns fabricated from 4 angles, 3 inches by 3 inches by 5/16 inch thick and a plate 7 inches wide by 5/16 inch thick and is 14 feet high, bearing on a masonry pier or wall at the attic floor elevation. The beam to girder connections appear to be of the riveted, framed angle type, but the exact configuration is not known.

It appears that the proposed solar panels can be installed without undue difficulty, but a precise analysis was not attempted since information on the roofing system was not available. In the event that such information can be field-established, economies may be achieved by utilizing the existing steel beams to support all or part of the additional load.



FLAT PLATE SOLAR COLLECTOR PANELS FOR DOMESTIC HOT WATER

▨ **150 - 34"x 96" (3-HIGH)**
— ON EXISTING SLOPED ROOF - 24°
TOTAL PANEL AREA - 2988 SQ. FT.

CANNON HOUSE OFFICE BUILDING ROOF PLAN

SCALE : 1" = 100'-0"

E. House Office Building Annex #2

1. General

The House Office Building Annex solar energy study, based on information received from the Office of the Architect of the Capitol, has a gross building area of 531,951 square feet, a net assignable area of 313,568 square feet, and has a population of 3,000 during the normal working day.

Domestic water is generated in one location in the basement by a steam to water heat exchanger.

Heating of the building perimeter is with hot water convectors. In addition, finned tube radiation is provided at various locations. The entire heating system is with 210°F. hot water generated by steam to hot water heat exchangers located in the basement of the building.

Air conditioning of the building is being provided with chilled water purchased from General Services Administration. The total building requirement is 1,200 tons of air conditioning.

Since there are no architectural restraints, solar collector panels can be installed over the entire roof area without limitation as to height or tilt angle.

The estimated domestic water energy load was compared with actual steam consumption during non-heating months (see page 151) and it was found to compare favorably with the metered consumption, thereby justifying the estimates not only for this building, but for the other buildings under study.

The economic and engineering analysis for the House Office Building Annex #2 is divided into four parts.

Part I provides analyses for 400 and 480 - 34" x 96" flat plate solar collectors at various tilt angles to provide the energy required to heat domestic water.

Part II provides analyses for 950 - 34" x 96" flat plate solar collectors at various tilt angles to provide 155° water for the building radiation. With this system, it will be necessary to add radiation to compensate for the reduced water temperature.

Part III provides analyses for 358 - 8'-0" x 10'-0" concentrating solar collectors at a tilt angle of 39° to provide the energy required to heat domestic water and to provide 210°F. water for the building radiation, without change to radiation.

Part IV provides analyses for 358 - 8'-0" x 10'-0" concentrating solar collectors at a tilt angle of 39° to provide the energy required to heat domestic water, to provide 210°F. water for winter heating and 240° water for air conditioning with the installation of a 150 ton hot water absorption chiller to provide partial cooling.

The solar system storage tanks and heat exchangers for the solar systems can be installed in basement mechanical room for piping interconnection to the existing domestic hot water and building heating systems.

The absorption air conditioning chiller as required for Part IV can be located in basement mechanical equipment room and related cooling tower can be located on the first floor roof between building wings. The absorption unit can be interconnected with the existing steam system through a new steam to hot water heat exchanger as a standby to the solar energy system.

By the use of year round operation of the solar energy system, greatest economies and efficiency is obtained.

2. Part I Analysis of Domestic Water Heating with Flat Plate Solar Collectors

a) Under consideration are the following:

(1) The use of three rows of 34" x 96" panels with a total of 400 panels having a collector area of 7,968 sq.ft.

(2) The use of four rows of 34" x 96" panels with a total of 480 panels having a collector area of 9,562 sq.ft.

See page 43 for roof plan of proposed panel configuration.

b) Summary of Annual Energy Supplied

Panel Size	Number	Area sq.ft.	Tilt Angle	Solar Energy Supply Btu x 10^6
34" x 96"	400	7,968	34°	1,483.9
(See pages			39°	1,489.5*
159 to 162)			44°	1,482.2
			49°	1,472.2
34" x 96"	480	9,562	34°	1,600.4
(See pages			39°	1,615.0*
164 to 167)			44°	1,610.0
			49°	1,599.0

*Optimum tilt angle

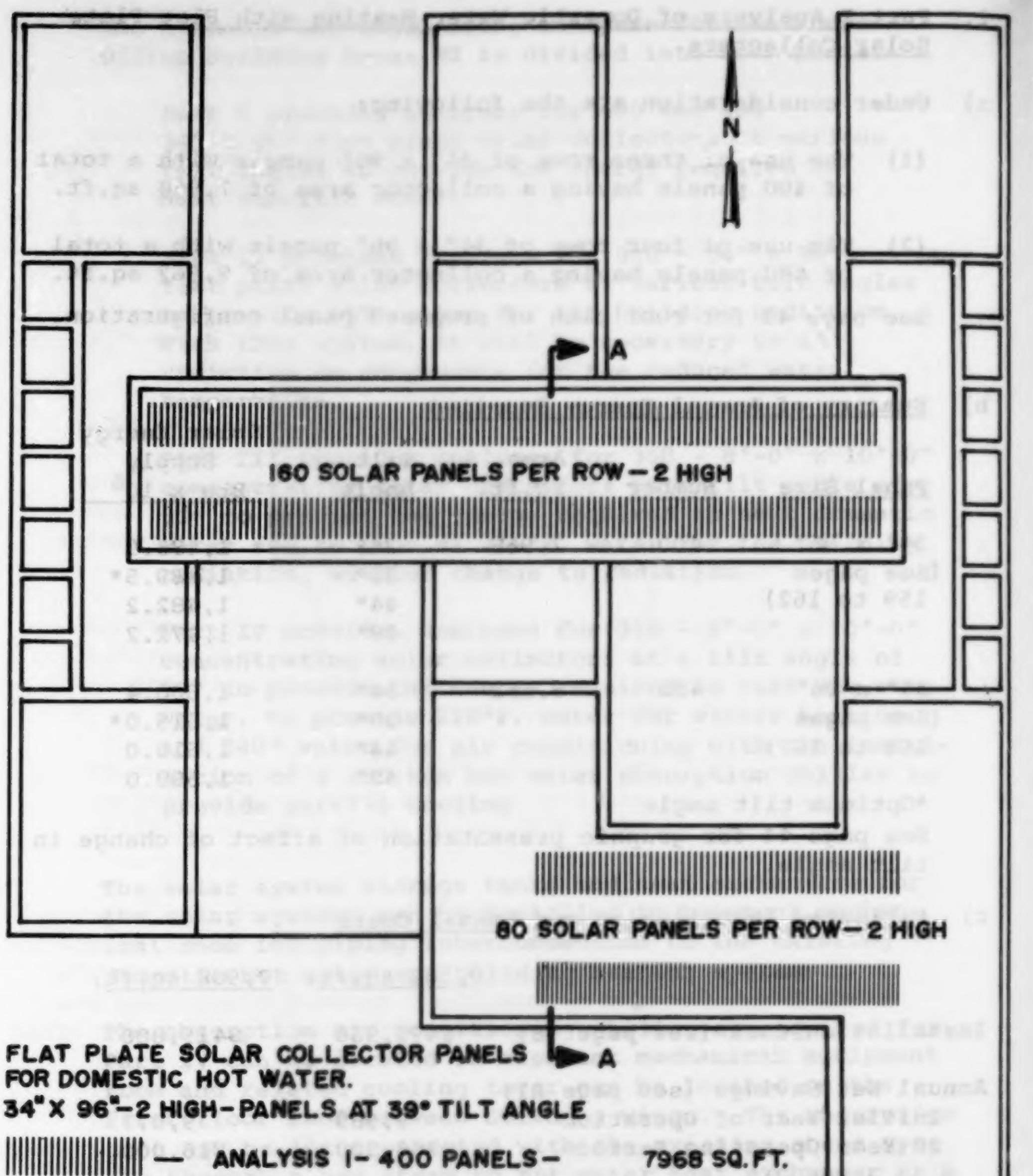
See page 44 for graphic presentation of affect of change in tilt angle.

c) Estimated Installation and Annual Costs

	9,562 sq.ft.	7,968 sq.ft.
Installation Cost (see page 78)	$475,950	$415,800
Annual Net Savings (see page 81)		
Initial Year of Operation	9,589	9,077
20 Year Operating Period	766,300	716,000
Years to Amortize Initial Investment (see page 81)	15.7 Years	15.2 Years

The added installation cost of the 9,562 sq.ft. solar collector system is amortized in 21.6 years (see page 81)

Of the two systems analyzed, the 7,968 sq.ft. system is recommended and will be used in the comparative analysis of Part IV.


N
A
160 SOLAR PANELS PER ROW—2 HIGH
80 SOLAR PANELS PER ROW—2 HIGH
A

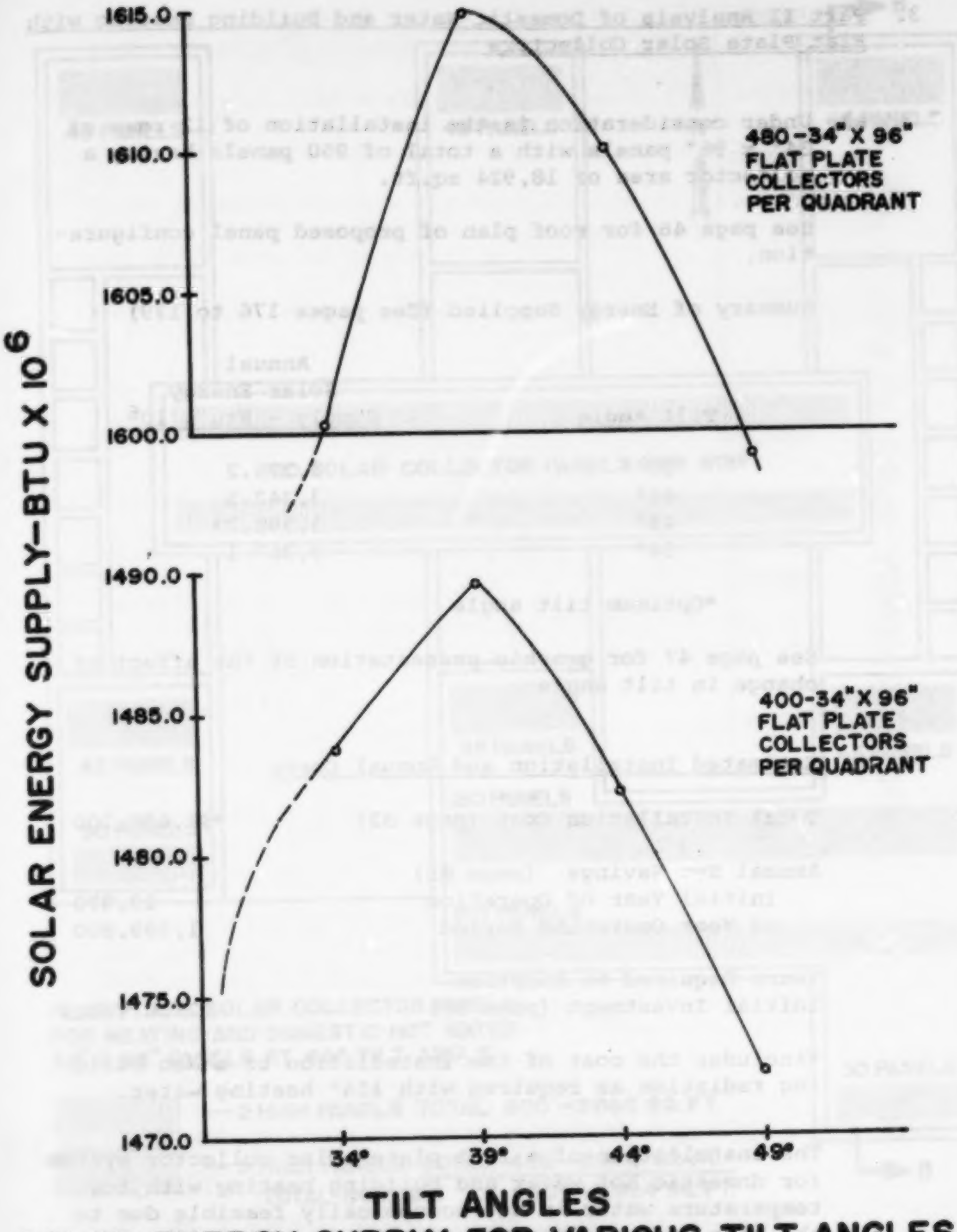
FLAT PLATE SOLAR COLLECTOR PANELS FOR DOMESTIC HOT WATER.
34" X 96"—2 HIGH—PANELS AT 39° TILT ANGLE

▥ — ANALYSIS 1—400 PANELS— 7968 SQ.FT.

▥ — ANALYSIS 2—80 PANELS ADDED—1594 SQ.FT.
TOTAL 480 PANELS 9562 SQ.FT.

HOUSE OFFICE BUILDING ANNEX NO. 2
ROOF PLAN

SCALE: 1" = 50'—0"



SOLAR ENERGY SUPPLY FOR VARIOUS TILT ANGLES
DOMESTIC WATER HEATING
HOUSE OFFICE BUILDING ANNEX NO. 2

3. Part II Analysis of Domestic Water and Building Heating with Flat Plate Solar Collectors

a) Under consideration is the installation of 12 rows of 34" x 96" panels with a total of 950 panels having a collector area of 18,924 sq.ft.

See page 46 for roof plan of proposed panel configuration.

Summary of Energy Supplied (See pages 176 to 179)

Tilt Angle	Annual Solar Energy Supply - Btu x 10^6
39°	3,275.2
44°	3,342.5
49°	3,398.7*
54°	3,367.1

*Optimum tilt angle

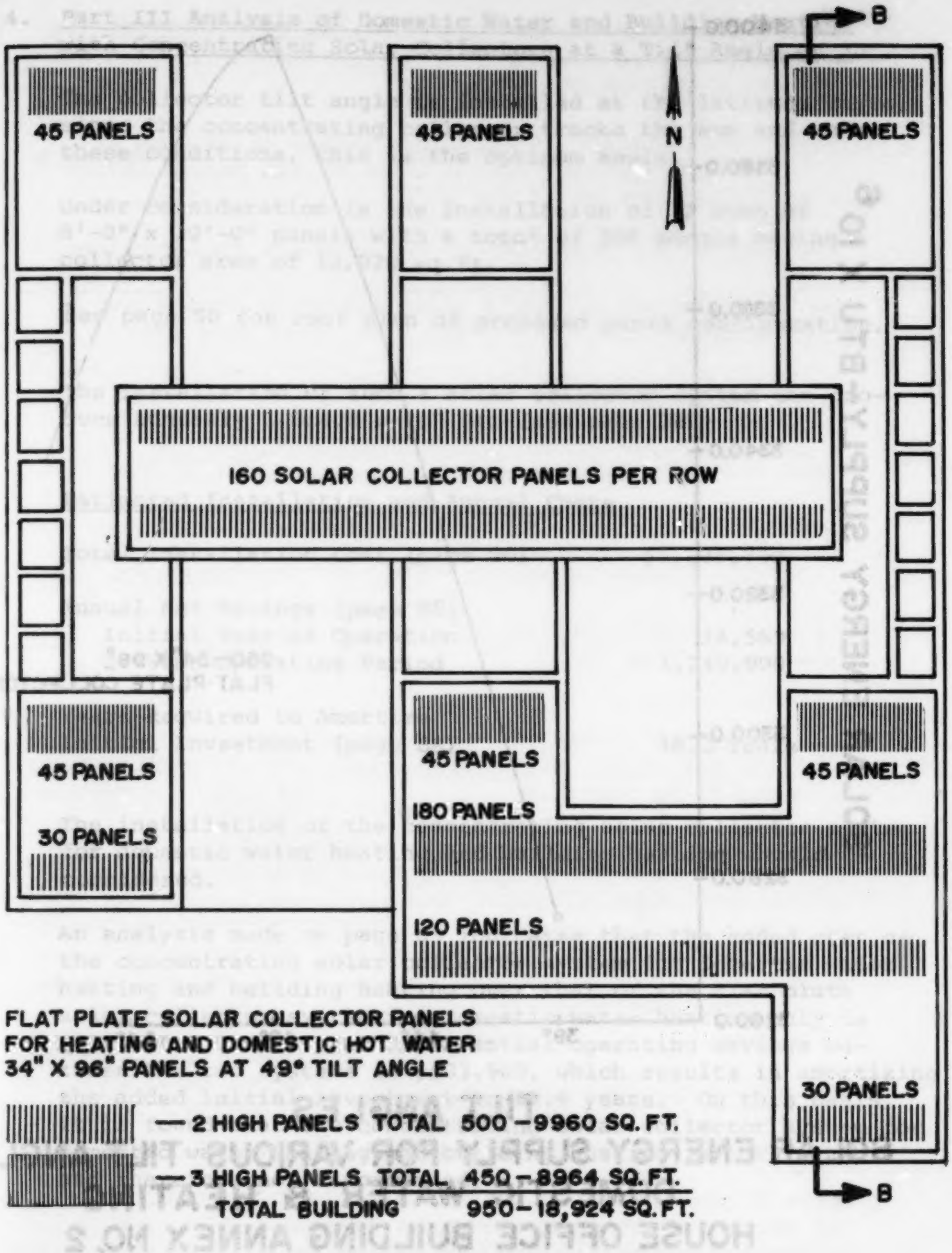
See page 47 for graphic presentation of the affect of change in tilt angle

b) Estimated Installation and Annual Costs

Total Installation Cost (page 82)	*$1,688,100
Annual Net Savings (page 85)	
Initial Year of Operation	19,870
20 Year Operating Period	1,599,800
Years Required to Amortize Initial Investment (page 85)	21.0 Years

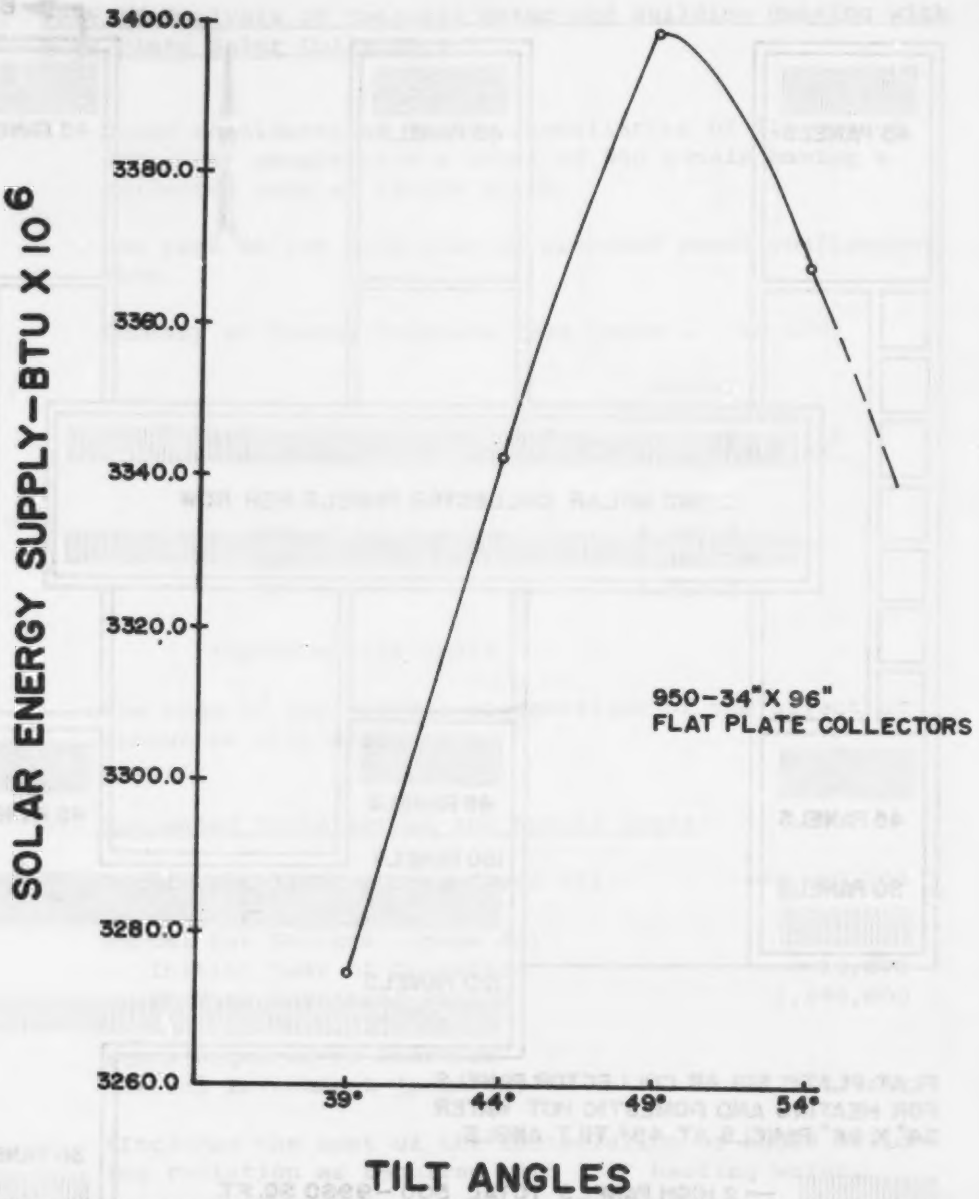
*Includes the cost of the installation of added building radiation as required with 155° heating water.

The installation of a flat plate solar collector system for domestic hot water and building heating with low temperature water is not economically feasible due to the high cost of increasing building radiation surface, and is not recommended.


B
N
45 PANELS
45 PANELS
45 PANELS
160 SOLAR COLLECTOR PANELS PER ROW
45 PANELS
30 PANELS
45 PANELS
180 PANELS
45 PANELS
120 PANELS
30 PANELS
B
FLAT PLATE SOLAR COLLECTOR PANELS
FOR HEATING AND DOMESTIC HOT WATER
34" X 96" PANELS AT 49° TILT ANGLE
— 2 HIGH PANELS TOTAL 500 – 9960 SQ. FT.
— 3 HIGH PANELS TOTAL 450 – 8964 SQ. FT.
TOTAL BUILDING 950 – 18,924 SQ. FT.

HOUSE OFFICE BUILDING ANNEX NO. 2
ROOF PLAN

SCALE: 1" = 50'-0"



SOLAR ENERGY SUPPLY FOR VARIOUS TILT ANGLES
DOMESTIC WATER & HEATING
HOUSE OFFICE BUILDING ANNEX NO. 2

4. Part III Analysis of Domestic Water and Building Heating with Concentrating Solar Collectors at a Tilt Angle of 39°.

The collector tilt angle is installed at the latitude angle, since the concentrating collector tracks the sun and under these conditions, this is the optimum angle.

Under consideration is the installation of 12 rows of 8'-0" x 10'-0" panels with a total of 358 panels having a collector area of 13,920 sq.ft.

See page 50 for roof plan of proposed panel configuration.

The installation of such a solar collector system can produce annually 2,814.8 x 10^6 Btu (see page 180)

Estimated Installation and Annual Costs

Total Installation Cost (page 86)	$1,036,700
Annual Net Savings (page 88)	
Initial Year of Operation	14,569
20 Year Operating Period	1,249,900
Years Required to Amortize Initial Investment (page 88)	18.3 Years

The installation of the concentrating solar collector system for domestic water heating and building heating should be considered.

An analysis made on page 89 indicates that the added cost of the concentrating solar collector system for domestic water heating and building heating over that of the flat plate solar collector system for domestic water heating only is $620,900 The 20 year differential operating savings between the two systems is $533,900, which results in amortizing the added initial investment in 21.4 years. On this basis, it is found that the concentrating solar collector system for domestic water heating and building heating is not feasible and therefore not recommended.

5. Part IV Analysis of Domestic Water, Building Heating and Absorption Air Conditioning with Concentrating Solar Collectors at a Tilt Angle of 39°.

Under consideration is the installation of 12 rows of 8'-0" x 10'-0" panels with a total of 358 panels having a collector area of 13,920 sq.ft.

See page 50 for roof plan of the proposed configuration.

The installation of such a solar collector system can produce annually 3,657.7 x 10^6 Btu. (See page 184)

Estimated Installation and Annual Costs

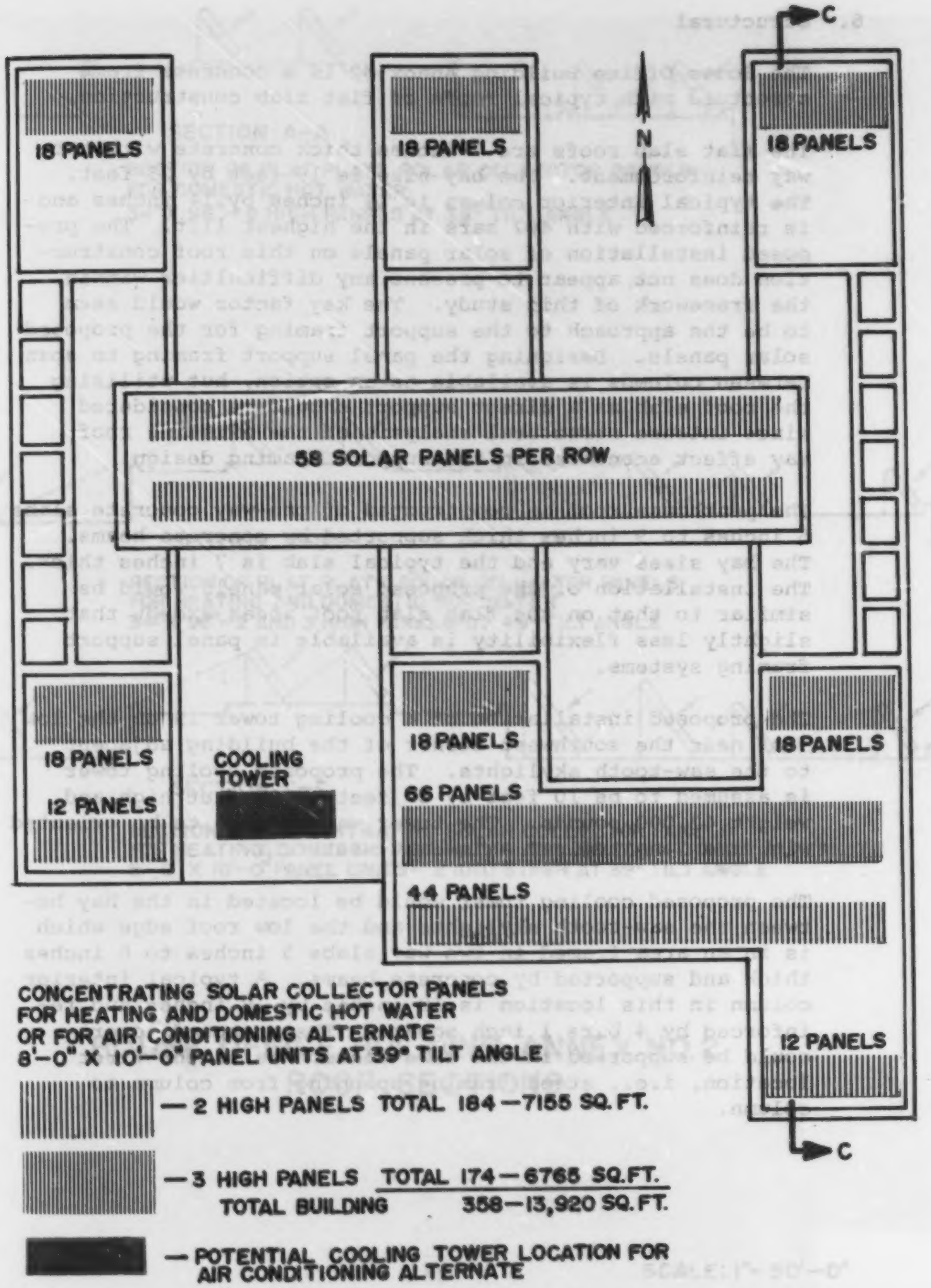
Total Installation Cost (page 90)	$1,223,800
Annual Net Savings (page 92)	
Initial Year of Operation	23,579
20 Year Operating Period	1,930,700
Years to Amortize Initial Investment (page 92)	15.8 Years

The use of the concentrating solar collector system for domestic hot water, building heating, and air conditioning is found to be feasible.

An analysis made on page 93 indicates that the added cost of the concentrating solar collector system for domestic hot water, building heating and air conditioning over that of a flat plate solar collector system for domestic water heating only is $808,000. The 20 year differential operating savings between the two systems is $1,214,700, which results in amortizing the added initial investment in 18.1 years.

The use of the concentrating solar collector system for domestic water heating, building heating and air conditioning is found to be feasible and is recommended.

Page 52 provides building cross-sections to indicate height of solar collectors above roof. Pages 53, 54 and 55 are various views of the building, which will be changed as per roof plan layout on page 50.


C
N
18 PANELS
18 PANELS
18 PANELS
58 SOLAR PANELS PER ROW
18 PANELS
COOLING TOWER
12 PANELS
18 PANELS
18 PANELS
66 PANELS
44 PANELS
12 PANELS
C
CONCENTRATING SOLAR COLLECTOR PANELS FOR HEATING AND DOMESTIC HOT WATER OR FOR AIR CONDITIONING ALTERNATE 8'-0" X 10'-0" PANEL UNITS AT 39° TILT ANGLE
— 2 HIGH PANELS TOTAL 184 — 7155 SQ. FT.
— 3 HIGH PANELS TOTAL 174 — 6765 SQ. FT.
TOTAL BUILDING 358 — 13,920 SQ. FT.
— POTENTIAL COOLING TOWER LOCATION FOR AIR CONDITIONING ALTERNATE

HOUSE OFFICE BUILDING ANNEX NO. 2 — ROOF PLAN

SCALE: 1" = 50'-0"

6. Structural

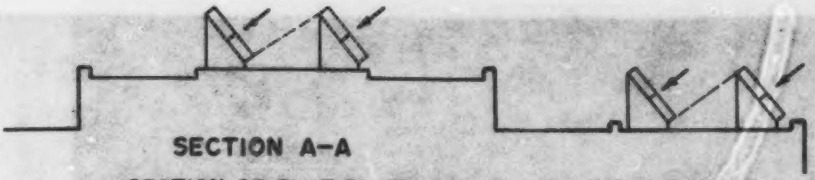
The House Office Building Annex #2 is a concrete frame structure with typical roofs of flat slab construction.

The flat slab roofs are 7 inches thick concrete with two-way reinforcement. The bay size is 19 feet by 23 feet. The typical interior column is 14 inches by 14 inches and is reinforced with 4#7 bars in the highest lift. The proposed installation of solar panels on this roof construction does not appear to present any difficulties within the framework of this study. The key factor would seem to be the approach to the support framing for the proposed solar panels. Designing the panel support framing to span between columns is available as an option, but utilizing the roof slab as a direct support should be considered since intense structural analysis of the existing roof may effect economies in the support framing design.

The penthouse roof is constructed of one-way concrete slabs 5 inches to 9 inches thick supported by concrete beams. The bay sizes vary and the typical slab is 7 inches thick. The installation of the proposed solar panels would be similar to that on the flat slab roof areas except that slightly less flexibility is available in panel support framing systems.

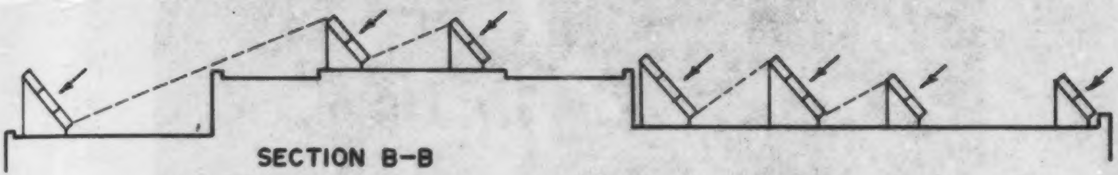
The proposed installation of a cooling tower is on the low roof near the southwest corner of the building adjacent to the saw-tooth skylights. The proposed cooling tower is assumed to be 10 feet by 50 feet by 16 feet high and weight 42,000 pounds. The tower was assumed to be oriented with its longitudinal axis east-west.

The proposed cooling tower would be located in the bay between the saw-tooth skylights and the low roof edge which is in an area framed in two-way slabs 5 inches to 6 inches thick and supported by concrete beams. A typical interior column in this location is 18 inches by 18 inches and reinforced by 4 bars 1 inch square. The proposed tower could be supported in the same fashion as in the first location, i.e., steel framing spanning from column to column.



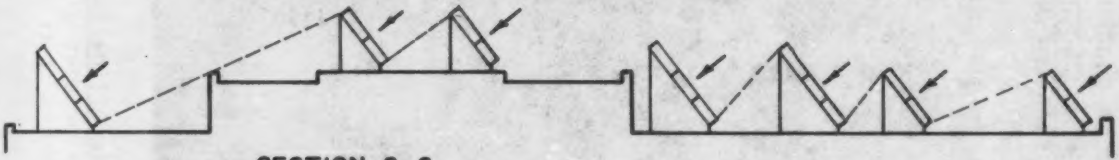
SECTION A–A

SECTION OF FLAT PLATE SOLAR COLLECTOR PANELS
FOR DOMESTIC HOT WATER
34" X 96"—2 HIGH PANELS AT 39° TILT ANGLE



SECTION B–B

SECTION OF FLAT PLATE SOLAR COLLECTOR PANELS
FOR HEATING AND DOMESTIC HOT WATER
34" X 96"—2 AND 3 HIGH PANELS AT 49° TILT ANGLE

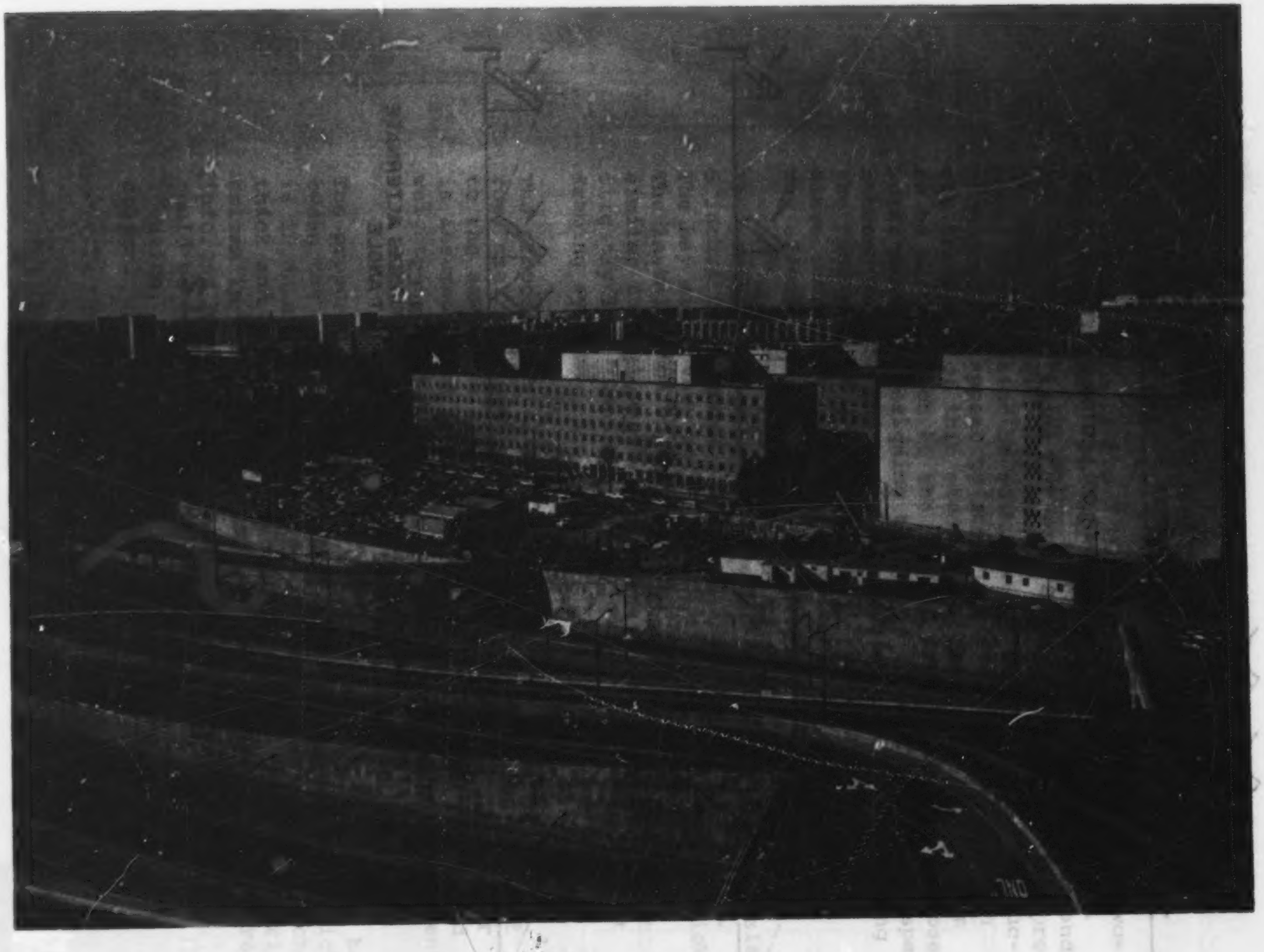


SECTION C–C

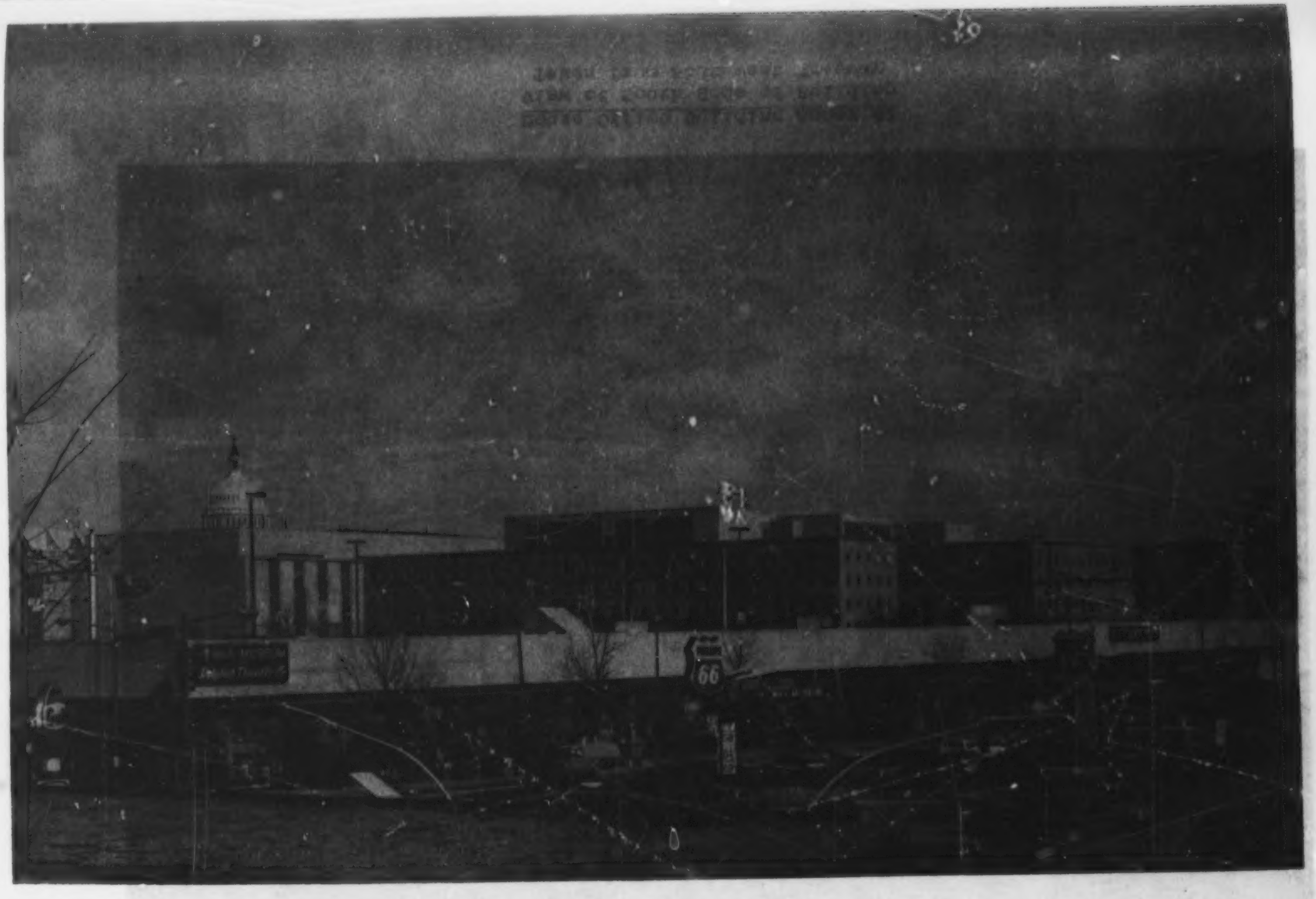
SECTION OF CONCENTRATING SOLAR COLLECTOR PANELS
FOR HEATING, DOMESTIC HOT WATER AND AIR CONDITIONING ALTERNATE
8'–0" X 10'–0" PANEL UNITS— 2 AND 3 HIGH AT 39° TILT ANGLE

HOUSE OFFICE BUILDING ANNEX NO. 2
ROOF SECTIONS

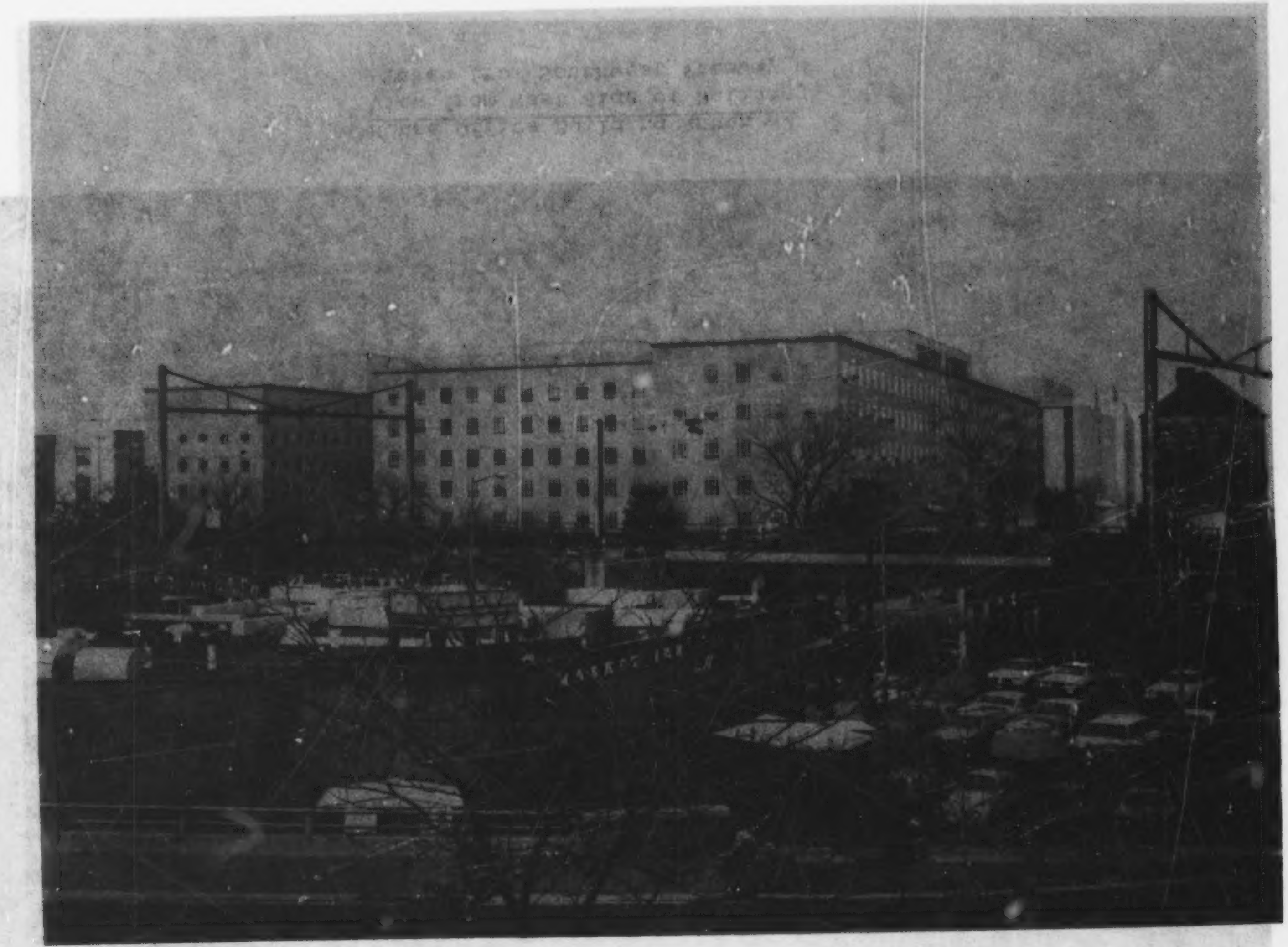
SCALE: 1" = 50'–0"



House Office Building Annex #2
View of East Side of Building
Taken from Canal Street



House Office Building Annex #2
View from West Side of Building
Taken from Southwest Freeway



House Office Building Annex #2
View of South Side of Building
Taken from Southwest Freeway

SECTION IV

Economic Analysis

IV. ECONOMIC ANALYSIS

A. General Information

The economic analysis for each building is based on the following criteria:

1. Costs for solar collectors have been obtained from PPG Industries for flat plate collectors and from Northrup, Inc., for concentrating collectors. These costs do not include labor.

2. Cost for other system components are based on equipment costs plus labor and on estimated costs of other items, which also include labor.

3. Excluded from installation costs are those items related to system monitoring, the cost of which would depend on the extent of such equipment. A reasonable budget for such an item could be $100,000 for the Rayburn House Office Building and House Office Building Annex #2.

4. All estimates include 10% contingency factor and a 26% mark up for contractor's overhead and profit. No costs are included for engineering fees or for administrative costs.

5. Maintenance and repair cost are based on experience and an information previously obtained from I.R.S. charts. In determing 20 year costs, an annual 6% inflation rate has been applied to the maintenance and repair cost.

6. In order to determine the actual energy requirement for domestic hot water and building heating, 80% efficiency factor has been applied to the total annual energy output required. This factor accounts for all distribution, piping and equipment losses as well as heat transfer losses. In determing energy requirements for air conditioning, a 90% efficiency factor was used.

7. The estimated cost of energy to supply steam for domestic hot water and heating are determined to be $6.50 per million Btu. This figure was determined after discussion with the Office of the Architect of the Capitol. The estimated cost for G.S.A. supply of chilled water for air conditioning of House Office Building Annex #2 was determined to be $0.16 per ton hour.

8. In determining 20 year cost savings with the use of solar energy, escalations of 15% per year for the initial four (4) years and 9% per year thereafter were utilized. The information is based on projections and various studies by the Army Corps of Engineers and the Naval Facilities Engineering Command.

   a. The Army Corps of Engineers projection including inflation and real cost growth in "Engineering Instructions for Preparation of Feasibility Studies for Total Energy, Selective Energy and Heat Pump Systems" are:

      Fuel Oil - 10% increase per year for 4 years and 4% per year thereafter.

      Electricity - 20% increase per year for 4 years and 9% per year thereafter.

   b. Naval Facilities Engineering Command projections including inflation and short term growth for the initial four years, but not including inflation thereafter in "Energy Escalation Rates for Short Term Costing and Life Cycle Costing" are:

      Fuel Oil - 16% increase per year for 4 years and 8% per year thereafter.

      Electricity - 16% increase per year for 4 years and 6% per year thereafter.

9. In determing amortization period to pay off the initial installation, projected maintenance and repair costs are deducted from projected energy cost savings. Not included in these projections are annual insurance or capital investment costs, which although applicable in the private sector, do not apply for this project.

B. Rayburn House Office Building

1. Part I - Domestic Hot Water Analysis

(a) Single Row of Flat Plate Solar Collectors per Building Quadrant

(1) Estimated Installation Costs

	Solar Collector Areas	
	1,992 sq.ft.	1,724 sq.ft.
Number of Flat Plate Collector Panels	100	100
Size of Panels	34" x 96"	34" x 76"
Exterior Work:		
Flat Plate Solar Collectors	$23,000	$21,000
Structural Supports and Installation	15,000	13,500
Piping, Fittings, Valves and Insulation	4,500	4,000
Wall Enclosures at Rear of Structural Support Frame	9,500	8,000
Hoisting Costs	5,000	5,000
Interior Work:		
Storage Tanks, Installed	5,500	5,000
Piping, Fittings, Valves and Insulation	8,500	8,000
Pumps, Heat Exchanger and Accessories	6,500	6,000
Electrical	1,500	1,500
Controls	7,000	7,000
Architectural Modifications for Piping and Equipment thru Building	4,000	4,000
Total	$90,000	$83,000
Contingencies 10%	9,000	8,300
	$99,000	$91,300
Overhead and Profit 26%	25,700	23,700
Total Cost per Quadrant	$124,700	$115,000
Total Building Cost	$498,800	$460,000

(a) Single Row of Solar Collectors per Building Quadrant

(2) Estimated Maintenance and Repair Costs
M and R Factor is a Percent of Material Costs Only

	M and R Factor	Solar Collector Areas 1,992 sq.ft.	Solar Collector Areas 1,724 sq.ft.
Solar Panels	2%*	$460	$420
Structural Support Painting	2%	75	70
Piping, Valves and Insulation	2%	85	80
Pumps and Heat Exchanger		95	90
Electrical	2%	15	15
Controls	3%	70	70
Total Cost per Quadrant		$800	$745
Total Building Maintenance and Repair Cost			
Initial Year of Operation		$3,200	$2,980
20 Year Period Based on 6% Inflation		$128,000	$119,200

*Approximately $5.00 per year per flat plate solar collector.

(a) Single Row of Solar Collectors per Building Quadrant

(3) Estimated Energy Cost Savings

Total Annual Energy Output Required per Quadrant for Domestic Hot Water (See page 96)	648.0×10^6 Btu
Total Annual Energy Required @ 80% System Efficiency (Allows for All Pipe and Equipment Losses as well as Distribution)	810.0×10^6 Btu

	Solar Collector Areas 1,992 sq.ft.	 1,724 sq.ft.
Percent of Energy Saved with Solar Collectors @ 34° Tilt Angle (See pages 109 and 118)	64.92%	58.87%
Annual Energy Saved @ 80% System Efficiency (Btu x 10^6)	525.9	476.8
Cost Savings - Initial Year of Operation @ \$6.50/10^6 Btu	\$3,418	\$3,099
Total Savings for Building:		
Initial Year	\$13,672	\$12,396
20 Year Period	\$945,600	\$857,400

Although it is difficult to product future energy cost escalation due to many variables that exist, this analysis conservatively is based on a 15% energy cost increase per year for four years and 9% energy cost increase per year thereafter.

(a) Single Row of Solar Collectors per Building Quadrant

(4) Economic Summation

	Solar Collector Areas		Differential Costs
	1,992 sq.ft.	1,724 sq.ft.	
Total Installation Cost (page 58)	$498,800	$460,000	$38,800
Initial Year of Operation:			
Energy Cost Saved (page 60)	$13,672	$12,396	
Less Maintenance and Repair Cost (page 59)	3,200	2,980	
Net 1st Year Savings	$10,472	$9,416	$1,056
20 Years of Operation			
Energy Cost Saved (page 60)	$945,600	$857,400	
Less Maintenance and Repair Cost (page 59)	128,000	119,200	
Net 20 Year Savings	$817,600	$738,200	$79,400
Years Required to Amortize Initial Investment	15.6 Yrs	15.8 Yrs	

Excluded from the analysis is annual interest in the capital investment. Typical example for determination of amortization period (Based on 1,992 sq.ft. system)

	Energy Saved	M&R Cost	Net Saved
Initial Year	$ 13,672	$ 3,200	$10,472
5 Year Period	118,300	22,300	96,000
10 Year Period	287,600	47,900	239,700
15 Year Period	546,900	82,100	464,800
16 Year Period	613,500	90,300	523,200

The initial capital investment of $498,800 is recaptured after the 15th year.

The added installation cost of the 1,992 sq.ft. per wing solar collector system is amortized in 13.7 years and is recommended of the two systems.

(b) Parallel Rows of Flat Plate Solar Collectors per Building Quadrant

(1) Estimated Installation Costs

	Solar Collector Areas	
	2,988 sq.ft.	2,586 sq.ft.
Number of Flat Plate Collector Panels	150	150
Size of Panels	34" x 96"	34" x 76"
Exterior Work:		
Collector Panels	$34,500	$31,500
Structural Supports and Installation	24,000	21,500
Piping, Fittings, Valves and Insulation	7,500	6,500
Wall Enclosures at Rear of Structural Support Frame	15,000	13,000
Hoisting Cost	6,500	6,500
Interior Work:		
Storage Tanks, Installed	7,500	6,500
Piping, Fittings, Valves and Insulation	10,000	9,000
Pumps, Heat Exchangers and Accessories	7,500	7,000
Electrical	1,500	1,500
Controls	7,000	7,000
Architectural Modifications for Piping and Equipment thru Building	4,000	4,000
Total	$125,000	$114,000
Contingencies 10%	12,500	11,400
	$137,500	$125,400
Overhead and Profit 26%	35,800	32,600
Total Cost per Quadrant	$173,300	$158,000
Total Building cost	$693,200	$632,000

b. Parallel Rows of Solar Collectors per Building Quadrant

2) Estimated Maintenance and Repair Costs
M&R Factors are Percent of Material Costs Only

	M and R Factor	Solar Collector Areas 2,988 sq.ft.	Solar Collector Areas 2,586 sq.ft.
Solar Panels	2%*	$690	$630
Structural Support	2%	120	110
Piping, Valves and Insulation	2%	120	105
Pumps and Heat Exchanger	3%	110	105
Electrical	2%	15	15
Controls	3%	70	70
Total Cost per Quadrant		$1,125	$1,035
Total Building Maintenance and Repair Cost			
Initial Year of Operation		$4,500	$4,140
20 Year Period Based on 6% Inflation		$180,000	$166,400

*Approximately $5.00 per Year per Flat Plate Solar Collector.

(b) Parallel Rows of Solar Collectors per Building Quadrant

(3) Estimated Energy Cost Savings

	Solar Collector Areas	
	2,988 sq.ft.	2,586 sq.ft.
Total Annual Energy Required @ 80% System Efficiency (See page 60)	810.0 x 10^6 Btu	810.0 x 10^6 Btu
Percent of Energy Saved with Solar Collector System (see pages 123 and 124) 2-High Row @ 34° Tilt Angle 1-High Row @ 24° Tilt Angle	79.88%	74.63%
Annual Energy Saved at 80% System Efficiency (Btu x 10^6)	647.0	604.5
Cost Savings - Initial Year of Operation at $6.50/$10^6$ Btu	$4,206	$3,929
Total Savings for Building		
Initial Year	$16.824	$15,716
20 Year Period	$1,163,600	$1,087,000

b. Parallel Rows of Solar Collectors per Building Quadrant

(4) Economic Summation

	Solar Collector Areas 2,988 sq.ft.	Solar Collector Areas 2,586 sq.ft.	Differential Costs
Total Installation Cost (page 62)	$693,200	$632,000	$61,200
Initial Year of Operation			
Energy Cost Saved (p.64)	$16,824	$15,716	
Less Maintenance and Repair Cost (p.63)	4,500	4,140	
Net Savings	$12,324	$11,576	$748
20 Years of Operation			
Energy Cost Saved (p.64)	$1,163,600	$1,087,000	
Less Maintenance and Repair Cost (p.63)	180,000	166,400	
Net Savings	$983,600	$920,600	$63,000
Years Required to Amortize Initial Investment	16.8	16.6	

The added installation cost of the 2,988 sq. ft. per wing solar collector system is amortized in 19.8 years and is recommended of the two systems.

c. Comparative Analysis

1,922 sq.ft. Single Row Collector System per Quadrant vs.
2,988 sq.ft. Parallel Row Collector System per Quadrant

	Solar Collector Areas		Differen-tial Cost
	2,988 sq.ft. (See page 65)	1,992 sq.ft. (See page 61)	
Installation Cost	$693,200	$498,800	$194,400
Net 20 Year Savings	983,600	817,600	166,000

The added installation cost of the 2,988 sq.ft. per wing solar collector system is amortized in 21.5 years is not recommended of the two systems analyzed.

Based on the comparative analysis, a single row of 100 - 34" x 96" flat plate solar collectors with an area of 1,992 sq.ft. at each building quadrant is found to be the most economical for domestic water heating.

A. Rayburn House Office Building

2. Part II - Domestic Hot Water, Preheating of Outdoor Air and Summer Reheat

(a) Estimated Installation Costs

	Solar Collector Areas	
	17,928 sq.ft.	13,944 sq.ft.
Number of Flat Plate Collector Panels	900	700
Size of Panels	34" x 96"	24" x 96"
Exterior Work:		
Flat Plate Solar Collectors	$207,000	$161,000
Structural Supports and Installation	140,000	110,000
Piping, Fittings, Valves and Insulation	50,000	40,000
Wall Enclosures at Rear of Structural Supports	75,000	60,000
Hoisting Costs	35,000	30,000
Interior Work:		
Storage Tanks, Installed	45,000	38,000
Piping, Fittings, Valves and Insulation	80,000	65,000
Pumps, Heat Exchangers and Accessories	48,000	42,000
Electrical	12,000	10,000
Controls	35,000	35,000
Architectural Modifications for Piping and Equipment thru Building	30,000	30,000
Heating Coils:		
Coil Installation	18,000	18,000
Piping, Fittings, Valves and Insulation	26,000	26,000
Pumps and Accessories	24,000	24,000
Electrical	6,000	6,000
Controls	20,000	20,000
Hoisting and Rigging	5,000	5,000
Total	$856,000	$720,000
Contingencies 10%	85,600	72,000
	$941,600	$792,000
Overhead and Profit 26%	244,800	205,900
Total Installation Cost	$1,186,400	$997,900

(b) Estimated Maintenance and Repair Costs

M & R Factor is a Percent of Material Costs Only

	M and R Factor	Solar Collector Areas	
		17,928 sq.ft.	13,944 sq.ft.
Solar Panels	2%*	$4,140	$3,220
Structural Support Painting	2%	700	550
Piping, Valves and Insulation	2%	1,050	880
Pumps and Heat Exchangers	3%	1,080	990
Electrical	2%	180	160
Controls	3%	550	550
Total Maintenance and Repair Cost			
1st Year of Operation		$7,700	$6,350
20 Year Period Based on 6% Inflation		$308,000	$254,000

*Approximately $5.00 per year per flat plate solar collector.

(c) Estimated Energy Cost Savings

Total Annual Energy Output Required for Heating and Domestic Hot Water (See page 128)	$8,600.4 \times 10^6$ Btu
Total Annual Energy Required @ 80% System Efficiency (Allows for Pipe and Equipment Losses as well as Distribution)	$10,750.5 \times 10^6$ Btu

	Solar Collector Areas	
	17,928 sq.ft.	13,944 sq.ft.
Percent of Energy Saved with Solar Collectors @ 39° Tilt Angle (See page 135 and 137)	46.07%	39.02%
Annual Energy Saved at 80% System Efficiency, - Btu $\times 10^6$	4,952.7	4,194.9
Cost Savings - Initial Year of Operation at $\$6.50/10^6$ Btu	\$32,193	\$27,267
Savings over 20 Year Period Based on 15% Increase per Year for 4 Years and 9% Increase per Year Thereafter	\$2,227,700	\$1,887,300

(d) Economic Summation

	Solar Collector Area		Differential Costs
	17,928 sq.ft.	13,944 sq.ft.	
Installation Cost (page 67)	$1,186,400	$997,900	$188,500
Energy Cost Savings - First Year of Operation (page 69)	32,193	27,267	
Less Maintenance and Repair Cost (page 68)	7,700	6,350	
Net 1st Year Savings	$24,493	$20,917	$3,576
Energy Cost Savings Over 20 Years (page 69)	$2,227,700	$1,887,300	
Less Maintenance and Repair Cost (page 68)	308,000	254,000	
Net 20 Year Savings	$1,919,700	$1,633,300	$286,400
Years to Amortize Initial Investment	15.7 Years	15.6 Years	

The added installation cost of the 17,928 sq.ft. solar collector system is amortized in 16.7 years.

The 17,928 sq.ft. solar collector installation is recommended for use with heating and domestic hot water.

3. Economics of Added Cost to Provide Heating at Air Handling Equipment in Penthouse

Installation Cost - Flat Plate Solar Collector System

Domestic Hot Water and Heating System (17,928 sq.ft.) - See page 67	$1,186,400
Domestic Hot Water System (1,992 sq.ft. per quadrant or a total of 7,968 sq.ft.) - See page 58	498,800
Differential Installation Cost	$687,600

	Heating and Domestic Hot Water (See p.70)	Domestic Hot Water (See p.61)	Differential Cost
Initial Year Savings			
Energy	$32,193	$13,672	
Less M & R Cost	7,700	3,200	
Net 1st Year Savings	$24,493	$10,472	$14,021
20 Year Savings			
Energy	$2,227,700	$945,600	
Less M & R Cost	308,000	128,000	
Net 20 Year Savings	$1,919,700	$817,600	$1,102,100

The added installation cost of providing heating at air handling equipment in penthouse is amortized in 15.8 years.

The 17,928 sq.ft. solar collector installation is found to be economically feasible for heating domestic hot water, preheating of outdoor air of air handling equipment in winter and reheating of supply air in summer.

C. Longworth House Office Building

1. Domestic Hot Water Analysis

(a) Estimated Installation, Maintenance and Repair Costs for 50 Flat Plate Solar Collector System (862 sq.ft.)

M & R Factor is a Percentage of Material Cost

	Installation Cost	M and R Factor	Maintenance and Repair Cost
Exterior Work:			
Flat Plate Solar Collectors	$10,500	2%	$210
Structural Supports and Installation	7,500	2%	38
Piping, Fittings, Valves and Insulation	3,000	2%	20
Hoisting Costs	4,000	2%	
Interior Work:			
Storage Tanks, Installed	3,000		
Piping, Fittings, Valves and Insulation	5,000	2%	35
Pumps, Heat Exchangers, and Accessories	5,000	3%	75
Electrical	1,000	2%	10
Controls	7,000	3%	70
Architectural Modifications for Piping and Equipment thru Building	5,000		
Total	$51,000		$458
Contingencies 10%	5,100		
	$56,100		
Overhead and Profit 26%	14,600		
Total Installation Cost	$70,700		
20 Year Maintenance and Repair Cost Based on 6% Inflation			$18,300

(b) Estimated Energy Cost Savings

Total Annual Energy Output Required for Domestic Hot Water (See page 138)	1,740.0 x 10^6 Btu
Total Annual Energy Required @ 80% System Efficiency (Allows for Pipe and Equipment Losses as well as Distribution)	2,175.0 x 10^6 Btu
Percent of Energy Saved with Solar Collectors @ 34° Tilt Angle (See page 143)	8.95%
Annual Energy Saved at 80% System Efficiency - Btu x 10^6	194.7
Cost Savings - Initial Year of Operation at \$6.50/10^6 Btu	\$1,266
Savings over 20 Year Period Based on 15% Increase per Year for 4 Years and 9% Increase per Year Thereafter	\$87,600

(c) Economic Summation

Installation Cost (page 72)	$70,700
Energy Cost Savings - First Year of Operation (page 73)	1,266
Less Maintenance and Repair Cost (page 72)	458
Net 1st Year Savings	$808
Energy Cost Savings over 20 Years (page 73)	87,600
Less Maintenance and Repair Cost (page 72)	18,300
Net 20 Year Savings	$69,300

The installation cost of the 862 sq.ft. solar collector system is amortized in 20.3 years.

The use of a solar collector system is not recommended.

D. Cannon House Office Building

1. Domestic Hot Water Analysis

(a) Estimated Installation, Maintenance and Repair Costs for 150 Flat Plate Solar Collector System (2,988 sq.ft.)
M & R Factor is a Percentage of Material Cost

	Installation Cost	M and R Factor	Maintenance and Repair Cost
Exterior Work:			
Flat Plate Solar Collectors	$34,500	2%	$690
Structural Supports and Installation	20,000	2%	100
Piping, Fittings, Valves and Insulation	6,000	2%	40
Hoisting Costs	6,000		
Interior Work:			
Storage Tanks, Installed	$7,000		
Piping, Fittings, Valves and Insulation	12,500	2%	$80
Pumps, Heat Exchangers, and Accessories	8,000	3%	120
Electrical	2,000	2%	20
Controls	7,000	3%	70
Architectural Modifications for Piping and Equipment thru Building	5,000		
Total	$108,000		$1,120
Contingencies 10%	10,800		
	$118,800		
Overhead and Profit 26%	30,900		
Total Installation Cost	$149,700		
20 Year Maintenance and Repair Cost Based on 6% Inflation			$44,800

(b) Estimated Energy Cost Savings

Total Annual Energy Output Required for Domestic Hot Water (See page 144)	$1,617.6 \times 10^6$ Btu
Total Annual Energy Required @ 80% System Efficiency (Allows for Pipe and Equipment Losses as well as Distribution)	$2,022.0 \times 10^6$ Btu
Percent of Energy Saved with Solar Collectors @ 24° Tilt Angle (See page 149)	28.64%
Annual Energy Saved at 80% System Efficiency - Btu $\times 10^6$	579.1
Cost Savings - Initial Year of Operation at $\$6.50/10^6$ Btu	$3,764
Savings over 20 Year Period Based on 15% Increase per Year for 4 Years and 9% Increase per year Thereafter	$260,300

(c) Economic Summation

Installation Cost (page 75)	$149,700
Energy Cost Savings - First Year of Operation(page 76)	3,764
Less Maintenance and Repair Cost (page 75)	1,120
Net 1st Year Savings	$2,644
Energy Cost Savings over 20 Years (page 76)	$260,300
Less Maintenance and Repair Cost (page 75)	44,800
Net 20 Year Savings	$215,500

The installation cost of the 2,988 sq.ft. solar collector system is amortized in 16.7 years.

The solar collector installation is recommended for use with domestic hot water.

E. House Office Building Annex #2

1. Part I - Domestic Hot Water Analysis

(a) Estimated Installation Costs

	Solar Collector Areas	
	9,562 sq.ft.	7,968 sq.ft.
Number of Flat Plate Collector Panels	480	400
Size of Panels	34" x 96"	34" x 96"
Exterior Work:		
Flat Plate Solar Collectors	$110,400	$92,000
Structural Supports and Installation	75,000	65,000
Piping, Fittings, Valves and Insulation	28,000	25,000
Hoisting Costs	18,000	16,000
Interior Work:		
Storage Tanks, Installed	24,000	20,000
Piping, Fittings, Valves and Insulation	34,000	30,000
Pumps, Heat Exchangers and Accessories	22,000	20,000
Electrical	5,000	5,000
Controls	15,000	15,000
Architectural Modifications for Piping and Equipment thru Building	12,000	12,000
Total	$343,400	$300,000
Contingencies 10%	34,340	30,000
	$377,740	$330,000
Overhead and Profit 26%	98,210	85,800
Total Installation Cost	$475,950	$415,800

(b) Estimated Maintenance and Repair Costs
M & R Factor is a Percent of Material Costs Only

	M and R Factor	Solar Collector Areas 9,562 sq.ft.	7,968 sq.ft.
Solar Panels	2%*	$2,208	$1,840
Structural Support Painting	2%	375	325
Piping, Valves and Insulation	2%	420	360
Pumps and Heat Exchanger	3%	330	300
Electrical	2%	50	50
Controls	3%	150	150
Total Maintenance and Repair Cost			
1st Year of Operation		$3,533	$3,025
20 Year Period Based on 6% Inflation		$141,300	$121,000

*Approximately $5.00 per year per flat plate solar collector.

(c) **Estimated Energy Cost Savings**

Total Annual Energy Output Required for Domestic Hot water (See page 150)	1,944.3 x 10^6 Btu
Total Annual Energy Required @ 80% System Efficiency (Allows for Pipe and Equipment Losses as well as Distribution)	2,430.4 x 10^6 Btu

	Solar Collector Areas	
	9,562 sq.ft.	7,968 sq.ft.
Percent of Energy Saved with Solar Collectors @ 39° Tilt Angle (See pages 160 and 165)	83.06%	76.61%
Annual Energy Saved at 80% System Efficiency - Btu x 10^6	2,018.7	1,861.9
Cost Savings - Initial Year of Operation at \$6.50/10^6 Btu	\$13,122	\$12,102
Savings over 20 Year Period Based on 15% Increase per Year for 4 Years and 9% Increase per Year Thereafter	\$907,600	\$837,000

(d) **Economic Summation**

	Solar Collector Area		Differential Costs
	9,562 sq.ft.	7,968 sq.ft.	
Installation Cost (page 78)	$475,950	$415,800	$60,150
Energy Cost Savings - First Year of Operation (page 80)	13,122	12,102	
Less Maintenance and Repair Cost (page 79)	3,533	3,025	
Net 1st Year Savings	$9,589	$9,077	$510
Energy Cost Savings over 20 Years (page 80)	$907,600	$837,000	
Less Maintenance and Repair Cost (page 79)	141,300	121,000	
Net 20 Year Savings	$766,300	$716,000	$50,300
Years to Amortize Initial Investment	15.7 Yrs	15.2 Yrs	

The added installation cost of the 9,562 sq.ft. solar collector system is amortized in 21.6 years.

The 7,968 sq.ft. solar collector installation is recommended for use with domestic hot water.

D. House Office Building Annex #2

2. Part II Heating and Domestic Hot Water Analysis Utilizing Flat Plate Solar Collectors with Increased Building Radiation to Accommodate 155° Supply Water Temperature

(a) Estimated Installation, Maintenance and Repair Costs for 950 Solar Collector Panels (18,924 sq.ft.)
M & R Factor is a Percentage of Material Cost Only.

	Installation Cost	M and R Factor	Maintenance and Repair Cost
Exterior Work			
Flat Plate Solar Collectors	$218,500	2%	$4,370
Structural Supports and Installation	150,000	2%	750
Piping Fittings, Valves and Insulation	45,000	2%	300
Hoisting Cost	25,000		
Interior Work			
Storage Tanks, Installed	40,000		
Piping, Fittings, Valves and Insulation	75,000	2%	500
Pumps, Heat Exchanger and Accessories	42,000	3%	630
Electrical	8,000	2%	80
Controls	15,000	3%	150
Architectural Modifications for Piping and Equipment thru Building	18,000		
Radiation (See Breakdown of Cost on Following Page)			
Fin Tube Radiation	$45,500		
Convectors	396,000		
Valves, Pipe and Fittings	140,000	2%	950
Total	$1,218,000		$7,730
Contingencies 10%	121,800		
	$1,339,800		
Overhead and Profit 26%	348,300		
Total Installation Cost	$1,688,100		
20 Year Maintenance and Repair Cost Based on 6% Inflation			$309,200

b) **Estimated Cost to Add Radiation in Rooms as Required When Supply Water Temperature is Reduced from 210°F to 155°F**

(1) Finned Tube Radiation - 1-1/4" Fins, 2-1/2" x 5-1/4"

Btuh Output	Length	Number	Cost/Unit	Total Cost
5,800	5 ft.	16	$150	$2,400
7,000	6 ft.	18	175	3,150
11,600	10 ft.	36	250	9,000
12,700	11 ft.	54	275	14,850
15,200	14 ft.	46	350	16,100
Total Cost				$45,500

(2) Convectors

Btuh Output	Size	Number	Cost/Unit	Total Cost
2,200	32 x 14 x 4	12	$175	$2,100
3,560	44 x 14 x 4	12	225	2,700
5,390	56 x 18 x 4	48	275	13,200
5,830	56 x 24 x 4	1,260	300	378,000
Total Cost				$396,000

c) Estimated Energy Cost Savings

Total Annual Energy Output Required for Heating and Domestic Hot Water (See page 168)	10,591.3 x 10^6 Btu
Total Annual Energy Required @ 80% System Efficiency (Allows for Pipe and Equipment Losses as Well as Distribution)	13,239.1 x 10^6 Btu
Percent of Energy Saved with Solar Collectors @ 49° Tilt Angle (See page 178)	32.09%
Annual Energy Saved at 80% System Efficiency	4,248.4 x 10^6 Btu
Cost Savings - Initial Year of Operation at \$6,50/10^6 Btu	\$27,600
Savings over 20 Year Period Based on 15% Increase per Year for 4 Years and 9% Increase per Year Thereafter	\$1,909,000

d) Economic Summation

Installation Cost (page 82)	$1,688,100
Energy Cost Savings First Year of Operation(page 84)	27,600
Less Maintenance and Repair Cost (Page 82)	7,730
Net 1st Year Savings	$19,870
Energy Cost Savings Over 20 Years (page 84)	$1,909,000
Less Maintenance and Repair Cost (page 82)	309,200
Net 20 Year Savings	$1,599,800

The installation cost of the 18,924 sq.ft. solar collector system, including the cost to increase building radiation, is amortized in 21.0 Years.

The use of the flat plate solar collector system is not recommended.

D. House Office Building Annex #2

3. Part III Heating and Domestic Hot Water Analysis Utilizing Concentrating Solar Collectors to Supply 210°F Heating Water to Existing Radiation

a) Estimated Installation and Maintenance and Repair Cost for 358 Concentrating Solar Collector Units (13,920 sq.ft.)
M and R Factors are Percent of Material Costs Only

	Installation Cost	M and R Factor	Maintenance and Repair Cost
Exterior Work:			
Solar Collectors	$412,000	1-1/2%*	$6,175
Structural Supports and Installation	90,000	2%	450
Piping, Fittings, Valves and Insulation	45,000	2%	300
Electrical	10,000	2%	100
Hoisting Cost	20,000		
Interior Work:			
Storage Tanks	30,000		
Piping, Fittings, Valves and Insulation	60,000	2%	400
Pumps, Heat Exchanger and Accessories	38,000	3%	600
Electrical	8,000	2%	80
Controls and Monitoring	20,000	3%	200
Architectural Modifications for Piping and Equipment thru Building	15,000		
Total	$748,000		$8,305
Contingencies 10%	74,800		
	$822,800		
Overhead and Profit 26%	213,900		
Total Installation Cost	$1,036,700		
20 Year Maintenance and Repair Cost Based on 6% Inflation			$332,200

*Approximately $16.00 per year per concentrating solar collector.

b) Estimated Energy Cost Savings

Total Annual Energy Output Required for Domestic Hot Water and Building Heating (See page 168)	$10,591.3 \times 10^6$ Btu
Total Annual Energy Required at 80% System Efficiency Inclusive of all Equipment and Line Losses	$13,239.1 \times 10^6$ Btu
Percent of Energy Saved with Solar Collector System @ 39° Tilt Angle (See page 180)	26.58%
Annual Energy Saved @ 80% System Efficiency	$3,519.0 \times 10^6$ Btu
Cost Savings - Initial Year of Operation @ $\$6.50/10^6$ Btu	$22,874
Savings over 20 Year Period Based on 15% Increase per Year for 4 Years and 9% Increase per Year Thereafter	$1,582,100

c) Economic Summation

Installation Cost (page 86)	$1,036,700
Energy Cost Savings - 1st Year of Operation (page 87)	22,874
Less Maintenance and Repair Cost (p. 86)	8,305
Net 1st Year Savings	$14,569
Energy Cost Saving over 20 Years (p.87)	$1,582,100
Less Maintenance and Repair Cost (p.86)	332,200
Net 20 Year Savings	$1,249,900

The installation of the 13,920 sq.ft. solar collector system is amortized in 18.3 years.

The use of the solar collector system should be considered.

d) Economics of Added Cost to Provide Heating with Concentrating Solar Collectors

Installation Costs:

Heating and Domestic Hot Water System with Concentrator Panels (13,920 sq.ft.) - See page 86	$1,036,700
Domestic Hot Water System with Flat Plate Panels (7,968 sq.ft.) - See page 78.	415,800
Differential Installation Cost	$620,900

	Heating and Domestic Hot Water (See p. 88)	Domestic Hot Water (See p. 81)	Differential Cost
Initial Year Savings			
Energy	$22,874	$12,102	
Less M & R Cost	8,305	3,025	
Net 1st Year Savings	$14,569	$9,077	$5,492
20 Year Savings			
Energy	$1,582,100	$837,000	
Less M & R Cost	332,200	121,000	
Net 20 Year Savings	$1,249,900	$716,000	$533,900

The added installation cost for heating is amortized in 21.4 years.

Heating with concentrating solar collector system is not recommended.

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D. House Office Building Annex #2

4. Part IV Heating, Domestic Hot Water and Air Conditioning Analysis Utilizing Concentrating Solar Collectors to Supply 210°F Heating Water to Existing Radiation and 245°F Water to 150 ton Absorption Refrigeration Unit for Partial Air Conditioning.

a) Estimated Installation, Maintenance and Repair Cost
358 Concentrating Solar Collector Units (13,920 sq.ft.)
M and R Factors are Percent of Material Costs Only

	Installation Cost	M and R Factor	Maintenance and Repair Cost
Exterior Work:			
Solar Collectors	$412,000	1-1/2%	$6,175
Structural Supports and Installation	90,000	2%	450
Piping, Fittings, Valves and Insulation	45,000	2%	300
Electrical	10,000	2%	100
Hoisting Cost	20,000		
Interior Work:			
Storage Tanks	30,000		
Pipe, Fittings, Valves and Insulation	60,000	2%	400
Pumps, Heat Exchanger and Accessories	38,000	3%	600
Electrical	8,000	2%	80
Controls and Monitoring	20,000	3%	200
Architectural Modifications for Piping and Equipment thru Building	15,000		
Chilled Water System:			
Absorption Chiller	40,000	3%	900
Cooling Tower	12,000	5%	400
Piping, Valves and Fittings	40,000	2%	260
Pumps and Accessories	20,000	3%	300
Electrical	5,000	2%	50
Temperature Controls	6,000	3%	60
Hoisting, Rigging and Building Equipment Entrance	12,000		
Total	$883,000		$10,275
Contingencies 10%	88,300		
	$971,300		
Overhead and Profit 26%	252,500		
Total Installation Cost	$1,223,800		
20 Year M&R Cost-6% Inflation			$411,000

b) Estimated Energy Cost Savings for Partial Air Conditioning

G.S.A. Purchased Chilled Water for 150 tons of Air Conditioning		
Annual Cooling Load (See page 182)	240,000 ton hours	
Cost at 90% System Efficiency to Include System and Line Loss and at $0.16/ton hour (Assumed)		$34,560
Energy Required for Absorption Air Conditioning (See page 182)	4,440.0 x 10^6 Btu	
Energy Required at 80% System Efficiency Inclusive of Equipment and Line Losses	5,550.0 x 10^6 Btu	
Percent of Energy Saved with Solar Collector System at 39° Tilt Angle (See page 184)	34.72%	
Annual Energy Saved at 80% System Efficiency	1,927.0 x 10^6 Btu	
Net Added Energy for Absorption Air Conditioning	3,628.0 x 10^6 Btu	
Cost of Added Energy at 3,628.0 x 10^6 Btu @ \$6.50/10^6		23,580
Net Air Conditioning Savings - Initial Year		$10,980
Energy Savings for Heating and Domestic Hot Water (See page 89)		22,874
Total Annual Savings Initial Year of Operation		$33,854
Savings Over 20 Year Period Based on 15% Increase per Year for 4 Years and 9% Increase per Year Thereafter		$2,341,700

c) Economic Summation

Installation Cost (page 90)	$1,223,800
Energy Cost Savings - 1st Year of Operation (page 9i)	33,854
Less Maintenance and Repair Cost (page 90)	10,275
Net 1st Year Savings	$23,579
Energy Savings over 20 Years (page 91)	$2,341,700
Less Maintenance and Repair Cost (page 90)	411,000
Net 20 Year Savings	$1,930,700

The installation of the 13,920 sq.ft. solar collector system is amortized in 15.8 years.

The use of the solar collector system for heating, domestic hot water and partial absorption air conditioning is recommended.

d) Economics of Added Cost to Provide Heating and Partial Air Conditioning

Installation Costs:

Concentrating Solar Collector System for Heating, Domestic Hot Water, and Air Conditioning including 150 ton Absorption Air Conditioning System (See page 90)	$1,223,800
Flat Plate Solar Collector System for Domestic Hot Water (See page 78)	415,800
Differential Installation Cost for Heating and Air Conditioning	$808,000

	Heating, Domestic Hot Water and Air Conditioning See page 92	Domestic Hot Water See page 81	Differential Cost
Initial Year Savings:			
Energy	$33,854	$12,102	
Less M&R Cost	10,275	3,025	
Net 1st Year Savings	$23,579	$9,077	$14,502
20 Year Savings:			
Energy	$2,341,700	$837,000	
Less M&R Cost	411,000	121,000	
Net 20 Year Savings	$1,930,700	$716,000	$1,214,700

The added installation cost of 13,920 sq.ft. solar collector system is amortized in 18.1 years.

The use of the solar collector system for heating and partial air conditioning is recommended.

SECTION V

Engineering Analysis

V. ENGINEERING ANALYSIS

A. General Information

The engineering analysis for each building is based on the following criteria:

1. Domestic hot water flow is computed based on estimated building population as obtained from the Office of the Architect of the Capitol and on the use of water savers and restrictors on plumbing fixtures.

2. Domestic hot water monthly heating requirement for each building is based on incoming water temperature as obtained from ASHRAE Applications of Solar Energy for Heating and Cooling Buildings, 1977, and on 140°F. water supply to the building. If water temperature supply is reduced, the hot water heating load would reduce and the collector efficiency would accordingly increase.

3. Heating loads are based on information obtained from building plans furnished by the Architect of the Capitol.

4. The number and type of solar collectors analyzed for each building is dictated by available building roof area, allowable limitations of collector tilt angle and height and in efficiencies realized to enable economic studies to be made in a separate section for comparative analysis as to installation costs and operating savings.

5. Solar collector characteristics and water flow are based on information obtained from PPG Industries for flat plate collectors and Northrup, Inc., for concentrating collectors. Data from other manufacturers may vary, but not enough to materially alter engineering analysis

6. Solar collector characteristics are modified for the use of 50% glycol and water solution to prevent freezing

7. Formulas for developing adjusted flat plate solar collector combined performance characteristics are obtained from Beckman, Klein and Duffie "Solar Heating Design", 1977.

8. The flat plate solar collector efficiences are based on the use of "f" charts as developed by S.A. Klein of the Solar Energy Laboratory of the University of Wisconsin and presented in Figure 4. These have been compared with manufacturer's efficiency curves and found to be favorable. For purpose of the analysis, the "f" charts are deemed to be a better tool to enable comparison of various collector sizes, areas and tilt angle.

9. Solar storage tanks are approximated at two times the respective collector area. Final determination will be dictated by detailed analysis of existing conditions and on hourly computerized analyses of loads. The increase in storage tank capacity, if deemed possible after the preparation of a plan for each area to determine actual conditions, would result in increased system efficiency.

10. In determining solar system efficiencies, assumed heat exchanger effectiveness of 75% was utilized. Minor variations may result in actual selection of equipment.

11. Section II "Tables and Figures" provides all data used to develop monthly incident solar radiation at various collector tilt angles for the Washington, D.C., area.

B. Rayburn House Office Building

1 Part I - Domestic Hot Water Analysis

a) Domestic Hot Water Load

Total Building Population - 4,000
Population of Quadrant - 1,000
Normal Work Day (5 1/2 Day Week)
People @ 2.5 GPD 2,500 GPD
Night and Visitor Load (5 Days/Week) = 800 GPD
Weekend Load (1 1/2 Days/Week) = 500 GPD

Month	Hot Water Usage	Water Supply Temperature °F	Temperature Rise °F	L BTU x 10^6
January	84,000	42	98	68.6
February	73,000	42	98	59.6
March	84,000	52	88	61.6
April	80,000	56	84	56.0
May	84,000	63	77	53.9
June	80,000	67	73	48.6
July	80,000	71	69	46.0
August	84,000	78	62	43.4
September	80,000	79	61	40.7
October	84,000	68	72	50.4
November	80,000	55	85	56.6
December	80,000	46	94	62.6
Total				648.0

ASHRAE 1977 Systems Handbook recommends for office buildings the use of 2.0 gallons of domestic hot water consumption per person per day. This figure has been increased to allow for special uses of showers, sinks and other uses not common to typical office buildings.
Hot water usage is based on gallons per month.
Water supply temperatures obtained from ASHRAE Applications of Solar Energy for Heating and Cooling of Buildings, 1977.
Water temperature rise is based on water being heated to 140°F.

L - Hot water heating load per month
(gallons/month x temperature rise x 8.33°)
See HOBA #2 Confirmation of Domestic Water Heating Load (Page 151) to substantiate monthly energy use.

(b) Analysis Based on the Use of 100 - 34" x 76" Solar Collector Panels - See Parts c thru g for Analysis of Other Sizes and Numbers of Panels

(1) Collector Combined Performance Characteristics - Flat Plate Solar Collectors

Intercept $b = F_R(ta)_n$	=	0.69 (See Figure 1)
Slope $m = F_RU_L$	=	0.70 (See Figure 1)

Collector Area (A_C)

100 Panels @ 17.24 sq.ft/Panel	1,724 sq.ft.

Collector Flow Rate - Based on Manufacturer's Data

100 Panels @ 1.0 gpm/Panel	100 gpm

Fluid Composition	50% Glycol/Water
Specific Gravity	1.05 lb/lb
Density 8.33 x 1.05	8.75 lb/gal
Specific Heat (C_p)	0.82 Btu/lb.°F

Collector Capacitance Rate (C_C)

GPM x Density x 60 Min/Hr x C_p =

100 x 8.75 x 60 x 0.82 = 43,050 Btuh/°F

Heat Transfer at 10° TD (165° - 155°) = 430,500 Btuh

Collector Heat Exchanger Modifier

Heat Exchange Effectiveness (e_s) 75%

Storage Flow Rated Based on 15° TD (155° - 140°)

$$\frac{430{,}500}{15° \times 8.33 \times 60 \times 75\%} = 76.5 \text{ gpm}$$

Storage Loop Capacitance Rate (C_S)

GPM x Density x 60 Min/Hr x C_p

76.5 x 8.33 x 60 x 1.0 = 38,250 Btuh/°F

$$X = \frac{C_C}{e_s \times C_S} = \frac{43{,}050}{0.75 \times 38{,}250} = 1.501$$

$$Y = \frac{A_C \times F_RU_L}{C_C} = \frac{1{,}724 \times 0.7}{43{,}050} = 0.0280$$

Adjusted System Performance:

$$\frac{1}{1 + Y(X-1)} \quad \frac{1}{1 + 0.028(1.501 - 1)} = 0.986$$

Adjusted $F_R(ta)n$ = 0.69 x 0.986 = 0.680

Adjusted F_RU_L = 0.70 x 0.986 = 0.690

(2) System Performance Factor D_1 for 1,724 sq.ft. Collector System

(a) Collector Tilt Angle - 24°

Month	S	L	S/L	D1
January	28,799	68.6	4.20	0.49
February	33,348	59.6	5.60	0.66
March	45,911	61.6	7.45	0.87
April	50,400	56.0	9.00	1.05
May	55,552	53.9	10.31	1.20
June	58,680	48.6	12.07	1.41
July	57,443	46.0	12.49	1.46
August	54,126	43.4	12.47	1.46
September	48,600	40.7	11.94	1.40
October	42,904	50.4	8.51	1.00
November	32,550	56.6	5.75	0.67
December	28,179	62.6	4.50	0.53

S - Monthly incident solar radiation on a tilted surface - Btu/Month/sq,ft. - See Table 1. (See page 187)

L - Hot water heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (ta)_n S}{L}$ = 1,724 sq.ft. x 0.680 x S/L = 1,172 S/L

(2) System Performance Factor D_1 for 1,724 sq.ft. Collector System

(b) Collector Tilt Angle - 29°

Month	S	L	S/L	D_1
January	30,163	68.6	4.40	0.52
February	34,356	59.6	5.76	0.68
March	46,283	61.6	7.51	0.88
April	49,920	56.0	8.91	1.04
May	54,405	53.9	10.09	1.18
June	56,820	48.6	11.69	1.37
July	56,234	46.0	12.22	1.43
August	53,599	43.4	12.35	1.45
September	48,600	40.7	11.94	1.40
October	43,555	50.4	8.64	1.02
November	34,380	56.6	6.07	0.71
December	30,008	62.6	4.79	0.56

S - Monthly incident solar radiation on a tilted surface - Btu/Month/sq,ft. - See Table 2. (See page 188)

L - Hot water heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (ta)_n S}{L}$ = 1,724 sq.ft. x 0.680 x S/L = 1,172 S/L

(2) System Performance Factor D_1 for 1,724 sq.ft. Collector System

(c) Collector Tilt Angle - 34°

Month	S	L	S/L	D_1
January	31,341	68.6	4.57	0.54
February	35,868	59.6	6.02	0.70
March	46,283	61.6	7.51	0.88
April	49,440	56.0	8.83	1.03
May	53,258	53.9	9.88	1.16
June	54,930	48.6	11.30	1.32
July	54,436	46.0	11.83	1.39
August	52,545	43.4	12.11	1.42
September	49,020	40.7	12.04	1.41
October	44,578	50.4	8.84	1.04
November	35,760	56.6	6.32	0.74
December	31,310	62.6	5.00	0.59

S - Monthly incident solar radiation on a tilted surface - Btu/Month/sq,ft. - See Table 3. (See page 189).

L - Hot water heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (ta)_n S}{L}$ = 1,724 sq.ft. x 0.680 x S/L = 1,172 S/L

(2) System Performance Factor D_1 for 1,724 sq.ft. Collector System

(d) Collector Tilt Angle - 39°

Month	S	L	S/L	D_1
January	32,333	68.6	4.71	0.55
February	36,120	59.6	6.06	0.71
March	46,686	61.6	7.58	0.89
April	48,960	56.0	8.74	1.02
May	51,522	53.9	9.56	1.12
June	53,070	48.6	10.92	1.28
July	52,638	46.0	11.44	1.34
August	51,491	43.4	11.86	1.39
September	49,020	40.7	12.04	1.41
October	45,570	50.4	9.04	1.06
November	36,660	56.6	6.48	0.76
December	32,395	62.6	5.17	0.61

S - Monthly incident solar radiation on a tilted surface - Btu/Month/sq.ft. - See Table 4. (See page 190)

L - Hot water heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (ta)_n S}{L}$ = 1,724 sq.ft. x 0.680 x S/L = 1,172 S/L

(2) System Performance Factor D_1 for 1,724 sq.ft. Collector System

(e) Collector Tilt Angle - 44°

Month	S	L	S/L	D_1
January	33,306	68.6	4.86	0.57
February	36,372	59.6	6.10	0.71
March	46,686	61.6	7.58	0.89
April	47,040	56.0	8.40	0.99
May	49,814	53.9	9.24	1.08
June	51,193	48.6	10.53	1.23
July	50,856	46.0	11.06	1.30
August	50,158	43.4	11.56	1.35
September	48,600	40.7	11.94	1.40
October	45,911	50.4	9.11	1.07
November	37,589	56.6	6.64	0.78
December	33,513	62.6	5.35	0.63

S - Monthly incident solar radiation on a tilted surface - Btu/Month/sq,ft. - See Table 5. (See page 191)

L - Hot water heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (ta)_n S}{L}$ = 1,724 sq.ft. x 0.680 x S/L = 1,172 S/L

(2) System Performance Factor D_1 for 1,724 sq.ft. Collector System

(f) Collector Tilt Angle - 49°

Month	S	L	S/L	D_1
January	34,100	68.6	4.97	0.58
February	36,624	59.6	6.14	0.72
March	46,283	61.6	7.51	0.88
April	46,560	56.0	8.31	0.97
May	47,523	53.9	8.82	1.03
June	48,690	48.6	10.02	1.17
July	48,453	46.0	10.53	1.23
August	48,298	43.4	11.13	1.30
September	47,730	40.7	11.73	1.37
October	46,252	50.4	9.18	1.08
November	38,280	56.6	6.76	0.79
December	34,441	62.6	5.50	0.64

S - Monthly incident solar radiation on a tilted surface - Btu/Month/sq.ft. - See Table 6. (See page 192)

L - Hot water heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_cF_R(ta)_n S}{L}$ = 1,724 sq.ft. x 0.680 x S/L = 1,172 S/L

(2) **System Performance Factor D_1 for 1,724 sq.ft. Collector System**

(g) Collector Tilt Angle - 54°

Month	S	L	S/L	D_1
January	34,472	68.6	5.03	0.59
February	36,876	59.6	6.19	0.73
March	45,911	61.6	7.45	0.87
April	45,120	56.0	8.06	0.94
May	45,229	53.9	8.39	0.98
June	45,570	48.6	9.38	1.10
July	45,477	46.0	9.89	1.16
August	46,159	43.4	10.64	1.25
September	46,860	40.7	11.51	1.35
October	46,252	50.4	9.18	1.08
November	38,730	56.6	6.84	0.80
December	34,813	62.6	5.56	0.65

S - Monthly incident solar radiation on a tilted surface - Btu/Month/sq,ft. - See Table 7. (See page 193)

L - Hot water heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (\tau\alpha)_n S}{L}$ = 1,724 sq.ft. x 0.680 x S/L = 1,172 S/L

(3) Correction Factors for 1,724 sq.ft. Collector System

(a) Storage Mass Capacitance Factor - K_1

Storage Tanks (3,300 Gallons) Sized for approximately Twice the Solar Collector Area.

2 @ 66" Diameter x 10 ft. Long

M = Volume Storage x Density

= 3,300 Gallons x 8.75 lbs/gallon

= 28,875 lbs.

Specific Heat (C_p) = 0.82 Btu/lb.°F

$$\frac{M\ C_p}{A_c} = \frac{28{,}875 \times 0.82}{1{,}724} = 13.73$$

K_1 from Figure 2 (See page 203) - 1.03

(b) Hot Water Factor - K_2

Tabulated on monthly basis for average daytime temperature and average cold water supply temperature. See Figure 3. (See page 204)

(4) System Performance Factor D_2 for 1,724 sq.ft. Collector System

Month	t_o °F	212-t_o °F	t_1 Hours/ Month	Cold Water Supply Temp - °F	Hot Water Factor K_2	D_2
January	38	174	744	42	1.01	2.34
February	40	172	672	42	0.99	2.35
March	48	164	744	52	1.16	2.81
April	58	154	720	56	1.19	2.89
May	68	144	744	63	1.26	3.07
June	76	136	720	67	1.33	3.28
July	80	132	744	71	1.40	3.66
August	78	134	744	78	1.65	4.65
September	72	140	720	79	1.71	5.18
October	61	151	744	68	1.45	3.96
November	50	162	720	55	1.21	3.05
December	40	172	744	46	1.07	2.68

t_o - Monthly average daytime temperature

$$D_2 = \frac{A_c\ F_R U_L (212-t_o)\ \text{Hours/Mo.} \times K_1 \times K_2}{L}$$

$$= 1{,}724\ \text{sq.ft.} \times 0.690\ (212 - t_o) \times \text{Hours/Mo} \times 1.03 \times K_2/L$$

$$= 1{,}225 \times \text{T.D.} \times \text{Hours/Mo} \times K_2/L$$

(5) Fraction of Heating Load Supplied by Solar Energy for 1,724 sq.ft. Collector System

(a) Collector Tilt Angle - 24°

Month	L	D_1	D_2	f	E
January	68.6	0.49	2.34	0.30	20.6
February	59.6	0.66	2.35	0.45	26.8
March	61.6	0.87	2.81	0.57	35.1
April	56.0	1.05	2.89	0.67	37.5
May	53.9	1.20	3.07	0.74	39.9
June	48.6	1.41	3.28	0.83	40.3
July	46.0	1.46	3.66	0.83	38.2
August	43.4	1.46	4.65	0.78	33.9
September	40.7	1.40	5.18	0.74	30.1
October	50.4	1.00	3.96	0.59	29.7
November	56.6	0.67	3.05	0.41	23.2
December	62.6	0.53	2.68	0.33	20.7
Total	648.0				376.0

L - Hot water Load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{376.0 \times 10^6}{648.0 \times 10^6} = 58.02\%$$

(5) Fraction of Heating Load Supplied by Solar Energy for 1,724 sq.ft. Collector System

(b) Collector Tilt Angle - 29°

Month	L	D_1	D_2	f	E
January	68.6	0.52	2.34	0.33	22.6
February	59.6	0.68	2.35	0.46	27.4
March	61.6	0.88	2.81	0.58	35.7
April	56.0	1.04	2.89	0.66	37.0
May	53.9	1.18	3.07	0.73	39.3
June	48.6	1.37	3.28	0.81	39.4
July	46.0	1.43	3.66	0.82	37.7
August	43.4	1.45	4.65	0.78	33.9
September	40.7	1.40	5.18	0.74	30.1
October	50.4	1.02	3.96	0.60	30.2
November	56.6	0.71	3.05	0.44	24.9
December	62.6	0.56	2.68	0.35	21.9
Total	648.0				380.1

L - Hot water Load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{380.1 \times 10^6}{648.0 \times 10^6} = 58.66\%$$

(5) Fraction of Heating Load Supplied by Solar Energy for 1,724 sq.ft. Collector System

(c) Collector Tilt Angle - 34°

Month	L	D_1	D2	f	E
January	68.6	0.54	2.34	0.35	24.0
February	59.6	0.70	2.35	0.47	28.0
March	61.6	0.88	2.81	0.58	35.7
April	56.0	1.03	2.89	0.65	36.4
May	53.9	1.16	3.07	0.72	38.8
June	48.6	1.32	3.28	0.79	38.4
July	46.0	1.39	3.66	0.80	36.8
August	43.4	1.42	4.65	0.76	33.0
September	40.7	1.41	5.18	0.75	30.5
October	50.4	1.04	3.96	0.61	30.7
November	56.6	0.74	3.05	0.46	26.0
December	62.6	0.59	2.68	0.37	23.2
Total	648.0				381.5

L - Hot water Load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{381.5 \times 10^6}{648.0 \times 10^6} = 58.87\%$$

(5) Fraction of Heating Load Supplied by Solar Energy for 1,724 sq.ft. Collector System

(d) Collector Tilt Angle - 39°

Month	L	D_1	D_2	f	E
January	68.6	0.55	2.34	0.36	24.7
February	59.6	0.71	2.35	0.48	28.6
March	61.6	0.89	2.81	0.59	36.3
April	56.0	1.02	2.89	0.65	36.4
May	53.9	1.12	3.07	0.70	37.7
June	48.6	1.28	3.28	0.77	37.4
July	46.0	1.34	3.66	0.78	35.9
August	43.4	1.39	4.65	0.75	32.6
September	40.7	1.41	5.18	0.75	30.5
October	50.4	1.06	3.96	0.62	31.2
November	56.6	0.76	3.05	0.47	26.6
December	62.6	0.61	2.68	0.39	24.4
Total	648.0				382.3

L - Hot water Load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{382.3 \times 10^6}{648.0 \times 10^6} = 59.00\%$$

(5) Fraction of Heating Load Supplied by Solar Energy for 1,724 sq.ft. Collector System

(e) Collector Tilt Angle - 44°

Month	L	D_1	D_2	f	E
January	68.6	0.57	2.34	0.38	26.1
February	59.6	0.71	2.35	0.48	28.6
March	61.6	0.89	2.81	0.59	36.3
April	56.0	0.99	2.89	0.63	35.3
May	53.9	1.08	3.07	0.68	36.7
June	48.6	1.23	3.28	0.75	36.5
July	46.0	1.30	3.66	0.76	35.0
August	43.4	1.35	4.65	0.73	31.7
September	40.7	1.40	5.18	0.74	30.1
October	50.4	1.07	3.96	0.63	31.8
November	56.6	0.78	3.05	0.48	27.2
December	62.6	0.63	2.68	0.40	25.0
Total	648.0				380.3

L - Hot water Load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{380.3 \times 10^6}{648.0 \times 10^6} = 58.69\%$$

(5) **Fraction of Heating Load Supplied by Solar Energy for 1,724 sq.ft. Collector System**

(f) Collector Tilt Angle - 49°

Month	L	D_1	D_2	f	E
January	68.6	0.58	2.34	0.39	26.8
February	59.6	0.72	2.35	0.49	29.2
March	61.6	0.88	2.81	0.58	35.7
April	56.0	0.97	2.89	0.62	34.7
May	53.9	1.03	3.07	0.66	35.6
June	48.6	1.17	3.28	0.72	35.0
July	46.0	1.23	3.66	0.73	33.6
August	43.4	1.30	4.65	0.71	30.8
September	40.7	1.37	5.18	0.73	29.7
October	50.4	1.08	3.96	0.63	31.8
November	56.6	0.79	3.05	0.49	27.7
December	62.6	0.64	2.68	0.41	25.7
Total	648.0				376.3

L - Hot water Load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{376.3 \times 10^6}{648.0 \times 10^6} = 58.07\%$$

(5) Fraction of Heating Load Supplied by Solar Energy for 1,724 sq.ft. Collector System

(g) Collector Tilt Angle - 54°

Month	L	D_1	D_2	f	E
January	68.6	0.59	2.34	0.40	27.4
February	59.6	0.73	2.35	0.50	29.8
March	61.6	0.87	2.81	0.57	35.1
April	56.0	0.94	2.89	0.60	33.6
May	53.9	0.98	3.07	0.62	33.4
June	48.6	1.10	3.28	0.68	33.0
July	46.0	1.16	3.66	0.69	31.7
August	43.4	1.25	4.65	0.69	29.9
September	40.7	1.35	5.18	0.72	29.3
October	50.4	1.08	3.96	0.63	31.8
November	56.6	0.80	3.05	0.50	28.3
December	62.6	0.65	2.68	0.42	26.3
Total	648.0				369.6

L - Hot water Load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{369.6 \times 10^6}{648.0 \times 10^6} = 57.04\%$$

c) **Analysis Based on the Use of 100 - 34" x 96" Solar Collector Panels**

(1) Collector Combined Performance Characteristics - Flat Plate Solar Collectors

Intercept b = $F_R(ta)_n$ = 0.69 (See Figure 1)

Slope m = F_RU_L = 0.70 (See Figure 1)

Collector Area (A_C)
100 Panels @ 19.92 sq.ft/Panel 1,992 sq.ft.

Collector Flow Rate - Based on Manufacturer's Data
100 Panels @ 1.25 gpm/Panel 125 gpm

Fluid Composition	50% Glycol/Water
Specific Gravity	1.05 lb/lb
Density 8.33 x 1.05	8.75 lb/gal
Specific Heat (C_p)	0.82 Btu/lb.°F

Collector Capacitance Rate (C_c)
GPM x Density x 60 Min/Hr x C_p =
125 x 8.75 x 60 x 0.82 = 53,812 Btuh/°F
Heat transfer at 10°TD (165° - 155°) = 538,120 Btuh

Collector Heat Exchanger Modifier
Heat Exchange Effectiveness (e_s) 75%
Storage Flow Rated Based on 15° TD (155° - 140°)

$$\frac{538{,}120}{15° \times 8.33 \times 60 \times 75\%} = 95.7 \text{ gpm}$$

Storage Loop Capacitance Rate (C_S)
GPM x Density x 60 Min/Hr x C_p
95.7 x 8.33 x 60 x 1.0 = 47,850 Btuh/°F

$$X = \frac{C_C}{e_S \times C_S} = \frac{53{,}812}{0.75 \times 47{,}850} = 1.499$$

$$Y = \frac{A_C \times F_RU_L}{C_C} = \frac{1{,}992 \times 0.7}{53{,}812} = 0.0259$$

Adjusted System Performance:

$$\frac{1}{1 + Y(X-1)} \quad \frac{1}{1 + 0.0259(1.499 - 1)} = 0.985$$

Adjusted $F_R(ta)n$ = 0.69 x 0.985 = 0.680

Adjusted F_RU_L = 0.70 x 0.985 = 0.690

(2) Correction Factors for 1,992 sq.ft. Collector System

(a) Storage Mass Capacitance Factor - K_1

Storage Tanks (3,800 Gallons) Sized for approximately Twice the Solar Collector Area.

2 @ 72" Diameter x 10 ft. Long

$$M = \text{Volume Storage} \times \text{Density}$$

$$= 3{,}800 \text{ Gallons} \times 8.75 \text{ lbs/gallon}$$

$$= 33{,}250 \text{ lbs.}$$

Specific Heat (C_p) = 0.82 Btu/lb.°F

$$\frac{M\,C_p}{A_c} = \frac{33{,}250 \times 0.82}{1{,}992} = 13.69$$

K_1 from Figure 2 (See page 203) - 1.03

(b) Hot Water Factor - K_2

Tabulated on monthly basis for average daytime temperature and average cold water supply temperature. See Figure 3. (See page 204)

$$D_1 = \frac{A_c F_R (ta)_n S}{L} = 1{,}992 \text{ sq.ft.} \times 0.680 \times S/L = 1{,}355\ S/L$$

$$D_2 = A_c F_R U_L (212 - t_o) \times \text{Hours/Month} \times K_1 \times K_2/L$$

$$= 1{,}992 \times 0.690 \times (212 - ta) \times \text{Hours/Month} \times 1.03 \times K_2/L$$

$$= 1{,}416 \times \text{T.D.} \times \text{Hours/Mo.} \times K_2/L$$

(3) Fraction of Heating Load Supplied by Solar Energy for 1,992 sq.ft. Collector System

(a) Collector Tilt Angle - 24°

Month	L	D_1	D_2	f	E
January	68.6	0.57	2.70	0.36	24.7
February	59.6	0.76	2.71	0.50	29.8
March	61.6	1.01	3.25	0.63	38.8
April	56.0	1.21	3.34	0.74	41.4
May	53.9	1.39	3.55	0.80	43.1
June	48.6	1.63	3.79	0.89	43.2
July	46.0	1.69	4.23	0.89	40.9
August	43.4	1.69	5.37	0.84	36.5
September	40.7	1.62	5.99	0.78	31.7
October	50.4	1.16	4.57	0.65	32.8
November	56.6	0.77	3.53	0.47	26.6
December	62.6	0.61	3.10	0.38	23.8
Total	648.0				413.3

Yearly fraction of total heating supplied by solar energy

$$\frac{413.3 \times 10^6}{648.0 \times 10^6} = 63.78\%$$

(3) Fraction of Heating Load Supplied by Solar Energy for 1,992 sq.ft. Collector System

(b) Collector Tilt Angle - 29°

Month	L	D_1	D_2	f	E
January	68.6	0.60	2.70	0.38	26.1
February	59.6	0.79	2.71	0.52	31.0
March	61.6	1.02	3.25	0.64	39.4
April	56.0	1.20	3.34	0.73	40.9
May	53.9	1.36	3.55	0.79	42.6
June	48.6	1.58	3.79	0.87	42.3
July	46.0	1.65	4.23	0.87	40.0
August	43.4	1.68	5.37	0.84	36.5
September	40.7	1.62	5.99	0.78	31.7
October	50.4	1.18	4.57	0.66	33.3
November	56.6	0.82	3.53	0.50	28.3
December	62.6	0.65	3.10	0.41	25.7
Total	648.0				417.8

Yearly fraction of total heating supplied by solar energy

$$\frac{417.8 \times 10^6}{648.0 \times 10^6} = 64.48\%$$

(3) Fraction of Heating Load Supplied by Solar Energy for 1,992 sq.ft. Collector System

(c) Collector Tilt Angle - 34°

Month	L	D_1	D_2	f	E
January	68.6	0.62	2.70	0.39	26.8
February	59.6	0.81	2.71	0.54	32.2
March	61.6	1.02	3.25	0.64	39.4
April	56.0	1.19	3.34	0.73	40.9
May	53.9	1.34	3.55	0.78	42.0
June	48.6	1.53	3.79	0.85	41.3
July	46.0	1.61	4.23	0.86	39.6
August	43.4	1.64	5.37	0.82	35.6
September	40.7	1.63	5.99	0.79	32.2
October	50.4	1.20	4.57	0.67	33.8
November	56.6	0.86	3.53	0.53	30.0
December	62.6	0.68	3.10	0.43	26.9
Total	648.0				420.7

Yearly fraction of total heating supplied by solar energy

$$\frac{420.7 \times 10^6}{648.0 \times 10^6} = 64.92\%$$

(3) **Fraction of Heating Load Supplied by Solar Energy for 1,992 sq.ft. Collector System**

(d) Collector Tilt Angle - 39°

Month	L	D_1	D_2	f	E
January	68.6	0.64	2.70	0.41	28.1
February	59.6	0.82	2.71	0.55	32.8
March	61.6	1.03	3.25	0.65	40.0
April	56.0	1.18	3.34	0.72	40.3
May	53.9	1.29	3.55	0.77	41.5
June	48.6	1.48	3.79	0.83	40.3
July	46.0	1.55	4.23	0.84	38.6
August	43.4	1.61	5.37	0.81	35.2
September	40.7	1.63	5.99	0.79	32.2
October	50.4	1.23	4.57	0.68	34.3
November	56.6	0.88	3.53	0.54	30.6
December	62.6	0.71	3.10	0.45	28.2
Total	648.0				421.1

Yearly fraction of total heating supplied by solar energy

$$\frac{421.1 \times 10^6}{648.0 \times 10^6} = 64.98\%$$

(3) **Fraction of Heating Load Supplied by Solar Energy for 1,992 sq.ft. Collector System**

(e) Collector Tilt Angle - 44°

Month	L	D_1	D_2	f	E
January	68.6	0.66	2.70	0.42	28.8
February	59.6	0.82	2.71	0.55	32.8
March	61.6	1.03	3.25	0.65	40.0
April	56.0	1.14	3.34	0.70	39.2
May	53.9	1.25	3.55	0.75	40.4
June	48.6	1.42	3.79	0.81	39.4
July	46.0	1.50	4.23	0.82	37.7
August	43.4	1.56	5.37	0.79	34.3
September	40.7	1.62	5.99	0.78	31.7
October	50.4	1.24	4.57	0.69	34.8
November	56.6	0.90	3.53	0.55	31.1
December	62.6	0.73	3.10	0.47	29.4
Total	648.0				419.5

Yearly fraction of total heating supplied by solar energy

$$\frac{419.5 \times 10^6}{648.0 \times 10^6} = 64.74\%$$

d) **Determination of System Performance Factors D_1 and D_2 with the Use of 50 - 34" x 76" Solar Collector Panels at a Tilt Angle of 24°**

Collector Area 862 sq.ft.
For Use in Combination with 100 - 34" x 76" Panel (Page)

Month	D_1	D_2
January	0.25	1.17
February	0.33	1.18
March	0.44	1.41
April	0.53	1.45
May	0.60	1.54
June	0.71	1.64
July	0.73	1.83
August	0.73	2.33
September	0.70	2.59
October	0.50	1.98
November	0.34	1.53
December	0.27	1.34

D_1 - 50% of D_1 for 1,724 sq.ft. solar collector system at a tilt angle of 24°. (See page 98)

D_2 - 50% of D_2 for 1,724 sq.ft. solar collector system. (See page 106)

The analysis is provided in order to determine combined D_1 and D_2 values of 150 - 34" x 76" solar collector panels as analyzed in (f).

e) Determination of System Performance Factors D_1 and D_2 with the Use of 50 - 34" x 96" Solar Collector Panels at a Tilt Angle of 24°

Collector Area - 996 sq.ft.
For Use in Combination with 100 - 34" x 96" Panels (Page

Month	D_1	D_2
January	0.29	1.35
February	0.38	1.36
March	0.51	1.63
April	0.61	1.67
May	0.70	1.78
June	0.82	1.90
July	0.85	2.12
August	0.85	2.69
September	0.81	3.00
October	0.58	2.29
November	0.39	1.77
December	0.31	1.55

D_1 - 50% of D_1 for 1,992 sq.ft. solar collector system at a tilt angle of 24°. (See page 116)

D_2 - 50% of D_2 for 1,992 sq.ft. solar collector system. (See page 116)

The analysis is provided to determine combined D_1 and D_2 values of 150 - 34" x 96" solar collector panels as analyzed in (g).

(f) Analysis for the Use of 150 - 34" x 76" Solar Collector Panels

100 - 34" x 76" Panels at Tilt Angle of 34°
50 - 34" x 76" Panels at Tilt Angle of 24°
150 GPM Flow Rate - 5,000 Gallon Storage
Total Collector Area - 2,586 sq.ft.

Month	L	D_1	D_2	f	E
January	68.6	0.79	3.51	0.48	32.9
February	59.6	1.03	3.53	0.63	37.5
March	61.6	1.32	4.22	0.75	46.2
April	56.0	1.56	4.34	0.84	47.0
May	53.9	1.76	4.61	0.89	48.0
June	48.6	2.03	4.92	0.98	47.6
July	46.0	2.12	5.49	0.98	45.1
August	43.4	2.15	6.98	0.92	39.9
September	40.7	2.11	7.77	0.88	35.8
October	50.4	1.54	5.94	0.76	38.3
November	56.6	1.08	4.58	0.60	34.0
December	62.6	0.86	4.02	0.50	31.3
Total	648.0				483.6

D_1 - Sum of D_1 value of each group of panels. (See p. 100 & 121)

D_2 - Sum of D_2 value of each group of panels. (See p. 106 & 121)

Yearly fraction of total heating supplied by solar energy

$$\frac{483.6 \times 10^6}{648.0 \times 10^6} = 74.63\%$$

(g) **Analysis for the Use of 150 - 34" x 96" Solar Collector Panels**

100 - 34" x 96" Panels at Tilt Angle of 34°
50 - 34" x 96" Panels at Tilt Angle of 24°
188 GPM Flow Rate - 6,000 Gallon Storage
Total Collector Area - 2,988 sq.ft.

Month	L	D_1	D_2	f	E
January	68.6	0.91	4.05	0.53	36.4
February	59.6	1.19	4.07	0.69	41.1
March	61.6	1.53	4.88	0.80	49.3
April	56.0	1.80	5.01	0.90	49.8
May	53.9	2.04	5.33	0.96	51.7
June	48.6	2.35	5.69	1.0	48.6
July	46.0	2.46	6.35	1.0	46.0
August	43.4	2.49	8.06	0.97	42.1
September	40.7	2.44	8.99	0.94	38.3
October	50.4	1.78	6.86	0.83	41.8
November	56.6	1.25	5.30	0.66	37.4
December	62.6	0.99	4.65	0.56	35.1
Total	648.0				517.6

D_1 - Sum of D_1 value of each group of panels. (See pages 118 & 122)

D_2 - Sum of D_2 value of each group of panels (See pages 118 & 122)

Yearly fraction of total heating supplied by solar energy

$$\frac{517.6 \times 10^6}{648.0 \times 10^6} = 79.88\%$$

2) Part II - Heating and Domestic Hot Water Analysis

a) Winter Heating Load

Present air handling units located in penthouse mechanical equipment room serve the building perimeter induction units. These units introduce 100% outdoor air heated by non-freeze steam preheaters to 55°F.

The total air flow of the air handling units is 71,570 cfm, with a combined heating load of 77,300 Btuh/°F.

Monthly heating requirements are as follows:

	Degree-Hours	Heating Load (Btu x 10^6)
January	15,347	1,186.3
February	12,176	941.2
March	5,595	432.5
April	2,700	208.7
September	363	28.1
October	1,764	136.4
November	6,332	489.5
December	14,312	1,106.3
Total		4,529.0

Degree Hours - Summation from breakdown on following page. (55°F. - Outdoor Temperature) x Hours

Heating Load - Degree Hours x 77,300 Btuh/°F

Hours of Outdoor Temperatures in Washington, D.C. Area

Outdoor Temperature Average 5° Range	Jan.	Feb.	March	Apr.	Sept.	Oct.	Nov.	Dec.	Total Hours
7°	2	--	--	--	--	--	--	--	2
12°	9	--	--	--	--	--	--	8	17
17°	20	18	--	--	--	--	--	16	54
22°	53	38	--	--	--	--	4	43	138
27°	102	68	6	--	--	--	10	82	254
32°	183	128	24	--	--	--	44	163	542
37°	210	158	84	41	--	10	75	166	744
42°	86	152	117	64	5	24	170	172	790
47°	43	60	165	97	20	90	141	68	684
52°	16	30	174	118	46	184	76	46	690

Total hours obtained from ASHRAE Guide.

Monthly breakdown determined from information obtained from National Weather Service Climatological Data.

b) Summer Reheat Load

Present air handling units located in penthouse mechanical equipment rooms serve various committee rooms. During periods of full occupancy in summer, units deliver 55°F air temperature to the committee rooms. During periods of light occupancy, steam reheat coils provide heating of the cool air to maintain proper environment. Reheat coils are designed to raise the 55°F temperature to 80°F.

The total air flow of the committee room units is 57,080 cfm with a combined heating load of 1,541 Mbh.

Monthly heat requirements are as follows:

	Hours of Reheat	Heating Load (Btu x 10^6)
May	120	184.9
June	200	308.2
July	200	308.2
August	200	308.2
September	160	246.6
October	80	123.3
Total		1,479.4

Hours of reheat are based on approximations as determined in discussion with the Office of the Architect of the Capitol.

c) Hot Water and Heating Load

Month	Heating	Hot Water	Total (L)
January	1,186.3	274.4	1,460.7
February	941.2	238.4	1,179.6
March	432.5	246.4	678.9
April	208.7	224.0	432.7
May	184.9	215.6	400.5
June	308.2	194.4	502.6
July	308.2	184.0	492.2
August	308.2	173.6	481.8
September	274.7	162.8	437.5
October	259.7	201.6	461.3
November	489.5	226.4	715.9
December	1,106.3	250.4	1,356.7
Total	6,008.4	2,592.0	8,600.4

d) Analysis with the Use of 700 - 34" x 96" Sollar Collector Panels

See Part e) for analysis with 900 - 34" x 96" Panels

(1) Location of Panels:

Wing (Quadrant) Roofs - Each of Four

Per Quadrant - 2-High Panels
@ 34° Tilt Angle with
100 Panels per Quadrant

Total for Four Wings 400 Panels - 7,968 sq.ft.

Wing (Quadrant) Roofs - Each of Four

Per Quadrant - 1-High Panel
@ 24° Tilt Angle with
50 Panels per Quadrant

Total for Four Wings 200 Panels - 3,984 sq.ft.

Sloping Roof Facing the Court

One Row of 2-High Panels
@ 29° Tilt Angle 100 Panels - 1,992 sq.ft.

Total 700 Panels - 13,944 sq.ft.

(2) **System Performance Factor D_1 for 3,984 sq.ft. Collector System**
200 - 34" x 96" Flat Plate Collectors at 24° Tilt Angle

Month	S	L	S/L	D_1
January	28,799	1,460.7	0.19	0.05
February	33,348	1,179.6	0.28	0.08
March	45,911	678.9	0.676	0.18
April	50,400	432.7	1.165	0.32
May	55,552	400.5	1.387	0.38
June	58,680	502.6	1.168	0.32
July	57,443	492.2	1.167	0.32
August	54,126	481.8	1.123	0.30
September	48,600	437.5	1.111	0.30
October	42,904	461.3	0.930	0.25
November	32,550	715.9	0.455	0.12
December	28,179	1,356.7	0.208	0.06

S - Monthly incident solar radiation on a tilted surface Btu/Month/sq.ft. - See Table 1. (See page 187)

L - Hot water and heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (ta)_n S}{L}$ = 3,984 sq.ft. x 0.680 x S/L = 2,709 S/L

(3) System Performance Factor D_1 for 1,992 sq.ft. Collector System
100 - 34" x 96" Flat Plate Collectors at 29° Tilt Angle

Month	S	L	S/L	D_1
January	30,163	1,460.7	0.206	0.03
February	34,356	1,179.6	0.291	0.04
March	46,283	678.9	0.682	0.09
April	49,920	432.7	1.154	0.16
May	54,405	400.5	1.358	0.18
June	56,820	502.6	1.131	0.15
July	56,234	492.2	1.143	0.16
August	53,599	481.8	1.112	0.15
September	48,600	437.5	1.111	0.15
October	43,555	461.3	0.944	0.13
November	34,380	715.9	0.480	0.07
December	30,008	1,356.7	0.221	0.03

S - Monthly incident solar radiation on a tilted surface Btu/Month/sq.ft. - See Table 2. (See page 188)

L - Hot water and heating load - Btu/Month x 10^6.

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R(ta)_n S}{L}$ = 1,992 sq.ft. x 0.680 x S/L = 1,355 S/L

(4) System Performance Factor D_1 for 7,968 sq.ft. Collector System
400 - 34" x 96" Flat Plate Collectors at 34° Tilt Angle

Month	S	L	S/L	D_1
January	31,341	1,460.7	0.215	0.12
February	35,868	1,179.6	0.304	0.17
March	46,283	678.9	0.682	0.37
April	49,440	432.7	1.143	0.62
May	53,258	400.5	1.330	0.72
June	54,930	502.6	1.093	0.59
July	54,436	492.2	1.106	0.60
August	52,545	481.8	1.091	0.59
September	49,020	437.5	1.120	0.61
October	44,578	461.3	0.966	0.52
November	35,760	715.9	0.500	0.27
December	31,310	1,356.7	0.231	0.13

S - Monthly incident solar radiation on a tilted surface Btu/Month/sq.ft. - See Table 3. (See page 189)

L - Hot water and heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R(ta)_n S}{L}$ = 7,968 sq.ft. x 0.680 x S/L = 5,418 S/L

(5) Correction Factors for 13,944 sq.ft. Collector System

(a) Storage Mass Capacitance Factor - K_1

Storage Tanks (28,500 Gallons) Sized for Approximately Twice the Solar Collector Area.

4 @ 3,000 Gallons in Basement Wing for Domestic Hot Water

3 @ 5,500 Gallons in Penthouse for Heating

M = Volume Storage x Density

= 28,500 Gallons x 8.75 lbs/gallon

= 249,375 lbs.

Specific Heat (C_p) = 0.82 Btu/lb.°F

$$\frac{M\ C_p}{A_c} = \frac{249,375 \times 0.82}{13,944} = 16.66$$

K_1 from Figure 2 (See page 203) - 1.02

(b) Hot Water Factor - K_2

Tabulated on monthly basis for average daytime temperature and average cold water supply temperature. See Figure 3. (See page 204)

(6) System Performance Factor D_2 for 13,944 sq.ft. Collector System

Month	t_o °F	212-t_o °F	t_1 Hours/ Month	Cold Water Supply Temp- °F	Hot Water Factor K_2	D_2
January	38	174	744	42	1.01	0.88
February	40	172	672	42	0.99	0.95
March	48	164	744	52	1.16	2.05
April	58	154	720	56	1.19	2.99
May	68	144	744	63	1.26	3.31
June	76	136	720	67	1.33	2.54
July	80	132	744	71	1.40	2.74
August	78	134	744	78	1.65	3.35
September	72	140	720	79	1.71	3.87
October	61	151	744	68	1.45	3.44
November	50	162	720	55	1.21	1.93
December	40	172	744	46	1.07	0.99

t_o - Monthly average daytime temperature.

$$D_2 - \frac{A_C F_R U_L (212-t_o)\text{Hours/Month} \times K_1 \times K_2}{L}$$

$$= 13{,}944 \text{ sq.ft.} \times 0.690(212 - t_o) \times \text{Hours/Month} \times 1.02 \times K_2/L$$

$$= 9{,}814 \times \text{T.D.} \times \text{Hours/Month} \times K_2/L$$

(7) Fraction of Heating Load Supplied by Solar Energy for 13,944 sq.ft. Collector System

Month	L	D_1	D_2	f	E
January	1,460.7	0.20	0.88	0.15	219.1
February	1,179.6	0.29	0.95	0.21	247.7
March	678.9	0.64	2.05	0.45	305.5
April	432.7	1.10	2.99	0.71	307.2
May	400.5	1.28	3.31	0.77	308.4
June	502.6	1.06	2.54	0.69	346.8
July	492.2	1.08	2.74	0.69	339.6
August	481.8	1.04	3.35	0.64	308.4
September	437.5	1.06	3.87	0.63	275.6
October	461.3	0.90	3.44	0.56	258.3
November	715.9	0.46	1.93	0.31	221.9
December	1,356.7	0.22	0.99	0.16	217.1
Total	8,600.4				3,356.2

D_1 - Summation of D_1 Values of Collector Systems at given tilt angle. See pages 130, 131 and 132)

D_2 - See page 134)

Yearly fraction of total heating supplied by solar energy:

$$\frac{3,356.2 \times 10^6}{8,600.4 \times 10^6} = 39.02\%$$

e) **Analysis with the Use of 900 - 34" x 96" Solar Collector Panels**

(1) Location of Panels

Wing (Quadrant) Roofs - Each of Four

Per Quadrant - 2-High Panels
@ 34° Tilt Angle with
100 Panels per Quadrant

Total for Four Wings 400 Panels - 7,968 sq.ft.

Wing (Quadrant) Roofs - Each of Four

Per Quadrant - 1-High Panel
@ 24° Tilt Angle with
50 Panels per Quadrant

Total for Four Wings 200 Panels - 3,984 sq.ft.

Sloping Roof Facing the Court

One Row of 2-High Panels
@ 29° Tilt Angle 100 Panels - 1,992 sq.ft.

Penthouse Roof - Each of Two per
Roof - 1-High Panel at
29° Tilt Angle. Two rows
with 50 Panels per Row.
Total for Two Penthouse
Roofs 200 Panels - 3,984 sq.ft.

Total 900 Panels - 17,928 sq.ft.

Storage: 4 @ 3,000 gallons in Basement Wings 12,000 gallons
4 @ 6,000 gallons in Penthouse 24,000 gallons
Total 36,000 gallons

(2) Fraction of Heating Load Supplied by Solar Energy for 17,928 sq.ft. Collector System

Month	L	D_1	D_2	f	E
January	1,460.7	0.26	1.13	0.18	262.9
February	1,179.6	0.37	1.22	0.27	318.5
March	678.9	0.82	2.64	0.54	366.6
April	432.7	1.42	3.84	0.81	350.5
May	400.5	1.64	4.26	0.88	352.4
June	502.6	1.36	3.27	0.81	407.1
July	492.2	1.40	3.52	0.81	398.7
August	481.8	1.34	4.31	0.75	361.4
September	437.5	1.36	4.98	0.72	315.0
October	461.3	1.16	4.42	0.66	304.5
November	715.9	0.60	2.48	0.40	286.4
December	1,356.7	0.28	1.27	0.19	257.8
Total	8,600.4				3,961.8

D_1 - Summation of D_1 Value of 13,944 sq.ft. solar collector system (See page 135) and D_1 value of 200 panels at 29° tilt angle (twice the value of D_1 from page 131).

D_2 - Prorated from 13,944 sq.ft. solar collector system.

Yearly fraction of total heating supplied by solar energy:

$$\frac{3,961.8 \times 10^6}{8,600.4 \times 10^6} = 46.07\%$$

. Longworth House Office Building

1) Domestic Hot Water Analysis

a) Domestic Hot Water Load

Total Building Population - 2700

Normal Work Day (5 1/2 Day Week)
People @ 2.5 GPD = 6750 GPD
Night and Visitor Load (5 Days/Week) = 2150 GPD
Weekend Load (1 1/2Days/Week) = 1350 GPD

Month	Hot Water Usage	Water Supply Temperature °F	Temperature Rise °F	L BTU x 10^6
January	225,000	42	98	183.7
February	198,000	42	98	161.6
March	225,000	52	88	164.9
April	215,000	56	84	150.4
May	225,000	63	77	144.3
June	215,000	67	73	130.7
July	215,000	71	69	123.6
August	225,000	78	62	116.2
September	215,000	79	61	109.2
October	225,000	68	72	134.9
November	215,000	55	85	152.2
December	215,000	46	94	168.3
Total				1,740.0

ASHRAE 1977 Systems Handbook recommends for office buildings the use of 2.0 gallons of domestic hot water consumption per person per day. This figure has been increased to allow for special uses of showers, sinks and other uses not common to typical office buildings.
Hot water usage is based on gallons per month.
Water supply temperatures obtained from ASHRAE Applications of Solar Energy for Heating and Cooling of Buildings. 1977.
Water temperature rise is based on water being heated to 140°F.

L - Hot water heating load per month
(Gallons/Month x Temperature Rise x 8.33)

b) Analysis Based on the Use of 50 - 34" x 76" Solar Collector Panels

(1) Collector Combined Performance Characteristics - Flat Plate Solar Collectors

Intercept b = F_R (ta)n = 0.69 (See figure 1)

Slope m = $F_R U_L$ = 0.70 (See figure 1)

Collector Area (A_C)
50 Panels @ 17.24 sq.ft./Panel 862 sq. ft.

Collector Flow Rate - Based on Manufacturer's Data
50 Panels @ 1.0 gpm/Panel 50 gpm

Fluid Composition 50% Glycol/Water
Specific Gravity 1.05 lb/lb
Density 8.33 x 1.05 8.75 lb/gal
Specific Heat (C_p) 0.82 Btu/lb.°F

Collector Capacitance Rate (C_C)
GPM x Density x 60 Min/Hr x C_p
50 x 8.75 x 60 x 0.82 = 21,525 Btuh/°F
Heat Transfer at 10° TD
(165° - 155°) = 215,250 Btuh

Collector Heat Exchanger Modifier
Heat Exchange Effectiveness (e_s) 75%
Storage Flow Rated Based on 15° TD (155° - 140°)

$$\frac{215,250}{15^{\circ} \times 8.33 \times 60 \times 75\%} = 38 \text{ gpm}$$

Storage Loop Capacitance Rate (C_S)
GPM x Density x 60 Min/Hr x C_p
38 x 8.33 x 60 x 1.0 = 19,000 Btuh/°F

$$X = \frac{C_c}{e_s \times C_S} = \frac{21,525}{0.75 \times 19,000} = 1\ 511$$

$$Y = \frac{A_C \times F_R U_L}{C_e} = \frac{862 \times 0.7}{21,525} = 0.0280$$

Adjusted System Performance:

$$\frac{1}{1 + Y(X-1)} = \frac{1}{1 + 0.028\ (1.511 - 1)} = 0.986$$

Adjusted F_R (ta)n = 0.69 x 0.986 = 0.680

Adjusted $F_R U_L$ = 0.70 x 0.986 = 0.690

(2) System Performance Factor D_1 for 862 sq. ft. Collector System At Collector Tilt Angle of 34°

Month	S	L	S/L	D_1
January	31,341	183.7	1.71	0.10
February	35,868	161.6	2.22	0.13
March	46,283	164.9	2.81	0.16
April	49,440	150.4	3.29	0.19
May	53,258	144.3	3.69	0.22
June	54,930	130.7	4.20	0.25
July	54,436	123.6	4.40	0.26
August	52,545	116.2	4.52	0.26
September	49,020	109.2	4.49	0.26
October	44,578	134.9	3.30	0.19
November	35,760	152.2	2.35	0.14
December	31,310	168.3	1.86	0.11

S - Monthly incident solar radiation on a tilted surface - Btu/Month/sq. ft. - See Table 3. (See page 189)

L - Hot Water Heating Load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (ta)n\ S}{L}$ = 862 sq. ft. x 0.680 x S/L = 586 S/L

(3) Correction Factors for 862 sq. ft. Collector System

(a) Storage Mass Capacitance Factor - K_1

Storage Tanks (1800 Gallons) Sized for approximately Twice the Solar Collector Area.

66" Diameter x 11 ft. Long

M = Volume Storage x Density

= 1800 Gallons x 8.75 lbs/gallon

= 15,750 lbs.

Specific Heat (C_p) = 0.82 Btu/lb.°F

$$\frac{M\ Cp}{A_C} = \frac{15750 \times 0.82}{862} = 14.98$$

K_1 from Figure 2 (See page 203) - 1.02

(b) Hot Water Factor - K_2

Tabulated on monthly basis for average daytime temperature and average cold water supply temperature. See Figure 3. (See page 204)

(4) System Performance Factor D_2 for 862 sq.ft. Collector System

Month	t_o °F	212-t_o °F	t_1 Hours/ Month	Cold Water Supply Temp - °F	Hot Water Factor K_2	D_2
January	38	174	744	42	1.01	1.16
February	40	172	672	42	0.99	1.16
March	48	164	744	52	1.16	1.39
April	58	154	720	56	1.19	1.43
May	68	144	744	63	1.26	1.52
June	76	136	720	67	1.33	1.63
July	80	132	744	71	1.40	1.81
August	78	134	744	78	1.65	2.30
September	72	140	720	79	1.71	2.67
October	61	151	744	68	1.45	1.96
November	50	162	720	55	1.21	1.51
December	40	172	744	46	1.07	1.33

t_o - Monthly average daytime temperature

$$D_2 = \frac{A_C F_R U_L (212-t_o) \text{ Hours/Mo} \times K_1 \times K_2}{L}$$

$$= 862 \text{ sq.ft.} \times 0.690 \ (212 - t_o) \times \text{Hours/Mo} \times 1.02 \times K_2/L$$

$$= 607 \times \text{T.D.} \times \text{Hours/Mo} \times K_2/L$$

(5) Fraction of Heating Load Supplied by Solar Energy for 862 sq.ft. Collector System

Collector Tilt Angle - 34°

Month	L	D_1	D_2	f	E
January	183.7	0.10	1.16	0.05	9.2
February	161.6	0.13	1.16	0.08	12.9
March	164.9	0.16	1.39	0.09	14.8
April	150.4	0.19	1.43	0.10	15.0
May	144.3	0.22	1.52	0.12	17.3
June	130.7	0.25	1.63	0.15	19.6
July	123.6	0.26	1.81	0.14	17.3
August	116.2	0.26	2.30	0.10	11.6
September	109.2	0.26	2.67	0.09	9.8
October	134.9	0.19	1.96	0.08	10.8
November	152.2	0.14	1.51	0.06	9.1
December	168.3	0.11	1.33	0.05	8.4
Total	1,740.0				155.8

L - Hot water Load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{155.8 \times 10^6}{1,740.0 \times 10^6} = 8.95\%$$

D. Cannon House Office Building

1) Domestic Hot Water Analysis

(a) Domestic Hot Water Load

Total Building Population - 2,500
Normal Work Day (5 1/2 Day Week)
People @ 2.5 GPD = 6,250 GPD
Night and Visitor Load (5 Days/Week) = 2,000 GPD
Weekend Load (1 1/2 Days/Week) = 1,250 GPD

Month	Hot Water Usage	Water Supply Temperature °F	Temperature Rise °F	L BTU x 10^6
January	210,000	42	98	171.4
February	180,000	42	98	146.9
March	210,000	52	88	153.9
April	200,000	56	84	139.9
May	210,000	63	77	134.7
June	200,000	67	73	121.6
July	200,000	71	69	115.0
August	210,000	78	62	108.5
September	200,000	79	61	101.6
October	210,000	68	72	125.9
November	200,000	55	85	141.6
December	200,000	46	94	156.6
Total				1,617.6

ASHRAE 1977 Systems Handbook recommends for office buildings the use of 2.0 gallons of domestic hot water consumption per person per day. This figure has been increased to allow for special uses of showers, sinks and other uses not common to typical office buildings.
Hot water usage is based on gallons per month.
Water supply temperatures obtained from ASHRAE Applications of Solar Energy for Heating and Cooling of Buildings, 1977.
Water temperature rise is based on water being heated to 140°F.

L - Hot water heating load per month
(Gallons/Month x Temperature Rise x 8.33)

b) Analysis Based on the use of 150 - 34" x 96" Solar Collector Panels:

(1) Collector Combined Performance Characteristics - Flat Plate Solar Collectors

Intercept b = $F_R(ta)n$ = 0.69 (See Figure 1)

Slope m = F_RU_L = 0.70 (See Figure 1)

Collector Area (A_C)
150 Panels @ 19.92 sq. ft./Panel 2,988 sq. ft.

Collector Flow Rate - Based on Manufacturer's Data
150 Panels @ 1.25 gpm/Panel 188 gpm

Fluid Composition	50% Glycol/Water
Specific Gravity	1.05 lb/lb
Density 8.33 x 1.05	8.75 lb/gal
Specific Heat (C_p)	0.82 Btu/lb.^{o}F

Collector Capacitance Rate (C_c)
GPM x Density x 60 Min/Hr x C_p = 80,934
188 x 8.75 x 60 x 0.82
Heat Transfer at 10^{o} TD
(165° - 155°) = 809,340 Btuh

Collector Heat Exchanger Modifier
Heat Exchange Effectiveness (e_s) 75%
Storage Flow Rated Based on 15^{o} TD (155° - 140^{o})

$$\frac{809,340}{15^{o} \times 8.33 \times 60 \times 75\%} = 144 \text{ gpm}$$

Storage Loop Capacitance Rate (C_S)
GPM x Density x 60 Min/Hr x C_p

144 x 8.33 x 60 x 1.0 = 72,000Btuh/^{o}F

$$X = \frac{C_c}{e_s \times C_S} = \frac{80,934}{0.75 \times 72,000} = 1,499$$

$$Y = \frac{A_C \times F_RU_L}{C_c} = \frac{2988 \times 0.7}{80,934} = 0.0258$$

Adjusted System Performance:

$$\frac{1}{1 + Y(X-1)} \quad \frac{1}{1 = 0.0258\ (1.499-1)} = 0.987$$

Adjusted $F_R(ta)n$ = 0.69 x 0.987 = 0.681

Adjusted F_RU_L = 0.70 x 0.987 = 0.691

(2) System Performance Factor D_1 for 2,988 sq.ft. Collector System at Collector Tilt Angle of 24°

Month	S	L	S/L	D_1
January	28,799	171.4	1.68	0.34
February	33,348	146.9	2.27	0.46
March	45,911	153.9	2.98	0.61
April	50,400	139.9	3.60	0.73
May	55,552	134.7	4.12	0.84
June	58,680	121.6	4.83	0.98
July	57,443	115.0	5.00	1.02
August	54,126	108.5	4.99	1.02
September	48,600	101.6	4.78	0.97
October	42,904	125.9	3.41	0.69
November	32,550	141.6	2.30	0.47
December	28,179	156.6	1.80	0.37

S - Monthly incident solar radiation on a tilted surface - Btu/Month/sq,ft. - See Table 1. (See page 187)

L - - Hot water heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (ta)_n S}{L}$ = 2,988 sq.ft. x 0.681 x S/L = 2,035 S/L

(3) Correction Factors for 2,988 sq.ft. Collector System

(a) Storage Mass Capacitance Factor - K_1

Storage Tanks (6,000 Gallons) Sized for approximately Twice the Solar Collector Area.

3 @ 66" Diameter x 12 ft. Long

M = Volume Storage x Density

= 6,000 Gallons x 8.75 lbs/gallon

= 52,500 lbs.

Specific Heat (C_p) = 0.82 Btu/lb.°F

$$\frac{M\ C_p}{A_c} = \frac{52,500 \times 0.82}{2,988} = 14.40$$

K_1 from Figure 2 (See page 203) - 1.02

(b) Hot Water Factor - K_2

Tabulated on monthly basis for average daytime temperature and average cold water supply temperature. See Figure 3. (See page 204)

(4) System Performance Factor D_2 for 2,988 sq.ft. Collector System

Month	t_o °F	212-to °F	t_1 Hours/ Month	Cold Water Supply Temp - °F	Hot Water Factor K_2	D_2
January	38	174	744	42	1.01	4.02
February	40	172	672	42	0.99	4.04
March	48	164	744	52	1.16	4.83
April	58	154	720	56	1.19	4.97
May	68	144	744	63	1.26	5.28
June	76	136	720	67	1.33	5.64
July	80	132	744	71	1.40	6.29
August	78	134	744	78	1.65	7.99
September	72	140	720	79	1.71	8.90
October	61	151	744	68	1.45	6.81
November	50	162	720	55	1.21	5.24
December	40	172	744	46	1.07	4.61

t_o - Monthly average daytime temperature

$$D_2 = \frac{A_C\ F_RU_L(212-t_o)\ \text{Hours/Mo} \times K_1 \times K_2}{L}$$

$$= 2{,}988\ \text{sq.ft.} \times 0.691\ (212 - t_o) \times \text{Hours/Mo} \times 1.02 \times K_2/L$$

$$= 2{,}106 \times \text{T.D.} \times \text{Hours/Mo} \times K_2/L$$

(5) Fraction of Heating Load Supplied by Solar Energy for 2,988 sq.ft. Collector System

(1) Collector Tilt Angle - 24°

Month	L	D_1	D_2	f	E
January	171.4	0.34	4.02	0.09	15.4
February	146.9	0.46	4.04	0.18	26.4
March	153.9	0.61	4.83	0.28	43.1
April	139.9	0.73	4.97	0.37	51.8
May	134.7	0.84	5.28	0.42	56.6
June	121.6	0.98	5.64	0.50	60.8
July	115.0	1.02	6.29	0.49	56.4
August	108.5	1.02	7.99	0.42	45.6
September	101.6	0.97	8.90	0.37	37.6
October	125.9	0.69	6.81	0.27	34.0
November	141.6	0.47	5.24	0.14	19.8
December	156.6	0.37	4.61	0.10	15.7
Total	1,617.6				463.2

L - Hot water Load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{463.2 \times 10^6}{1,617.6 \times 10^6} = 28.64\%$$

E. House Office Building Annex #2

1) Part I - Domestic Hot Water Analysis

a) Domestic Hot Water Load

Total Building Population - 3,000
Normal Work Day (5 1/2 Day Week)
3,000 People @ 2.5 GPD 7,500 GPD
Night and Visitor Load (5 Days/Week) = 2,400 GPD
Weekend Load (1 1/2 Days/Week) = 1,500 GPD

Month	Hot Water Usage	Water Supply Temperature °F	Temperature Rise °F	L BTU x 10^6
January	252,000	42	98	205.7
February	220,000	42	98	179.6
March	252,000	52	88	184.7
April	240,000	56	84	167.9
May	252,000	63	77	161.6
June	240,000	67	73	145.9
July	240,000	71	69	137.9
August	252,000	78	62	130.1
September	240,000	79	61	122.0
October	252,000	68	72	151.1
November	240,000	55	85	169.9
December	240,000	46	94	187.9
Total				1,944.3

ASHRAE 1977 Systems Handbook recommends for office buildings the use of 2.0 gallons of domestic hot water consumption per person per day. This figure has been increased to allow for special uses of showers, sinks and other uses not common to typical office buildings.
Hot water usage is based on gallons per month.
Water supply temperatures obtained from ASHRAE Applications of Solar Energy for Heating and Cooling of Buildings, 1977.
Water temperature rise is based on water being heated to 140°F.

L - Hot water heating load per month
(gallons/month x temperature rise x 8.33)

b) **Confirmation of Domestic Hot Water Load**

Based on 1975 Steam Consumption Charts of Actual Steam Consumption During a Non-Heating Period

	Period		
	May	June	July
Meter Reading	16 to 31	1 to 30	1 to 13
Final Reading	097271	100661	101917
Initial Reading	095443	097271	100661
Differential	1828	3390	1256
Steam Use During Period (lbs)	274,200	508,500	188,400

Steam Use = Differential Meter Reading x 150 Meter Factor
Steam usage during these months was for domestic water and kitchen equipment.

Estimated Kitchen Steam Use per Day Based on Information Obtained from Sarco Company Manual On Steam Consumption Rates:

Steam Tables	540 lbs/hr x 5 hrs	2,700 lbs
Bain Maries	220 lbs/hr x 5 hrs	1,100 lbs
Coffee Urns	125 lbs/hr x 12 hrs	1,500 lbs
Kettles	240 lbs/hr x 6 hrs	1,440 lbs
Dishwashers	360 lbs/hr x 6 hrs	2,160 lbs
Scullery Sinks	120 lbs/hr x 6 hrs	720 lbs
Total Average Daily Use		9,620 lbs

	May	June	July
Average Daily Use - Metered (lbs)	17,140	16,950	15,700
Less Estimated Kitchen Use (lbs)	9,620	9,620	9,620
Daily Domestic Water Steam Load (lbs)	7,520	7,330	6,080
Estimated Monthly Domestic Water Energy Requirement (Btu x 10^6) Based on Population (See page	161.6	145.9	137.9
Average Estimated Daily Load for Domestic Hot Water (Btu x 10^6)	5.21	4.86	4.45
Average Daily Steam Loads Based On Estimate (lbs)	7,940	7,410	6,780

Average daily steam load is based on 80% system efficiency (Takes into account all losses at equipment, piping and distribution) and 820 Btu/Lb. steam at meter pressure of 250 psig.

The estimated average daily steam load compares favorably with metered load with variation (within 10%) due to various usage factors of population, equipment and service.

c) Analysis Based on the Use of 400 - 34" x 96" Solar Collector Panels. See Section d) for Analysis with 480 - 34" x 96" Solar Collector Panels

(1) Collector Combined Performance Characteristics - Flat Plate Solar Collectors

Intercept b = $F_R(ta)_n$ = 0.69 (See Figure 1)

Slope m = F_RU_L = 0.70 (See Figure 1)

Collector Area (A_C)
400 Panels x 19.92 sq.ft/Panel 7,968 sq.ft.

Collector Flow Rate - Based on Manufacturer's Data
400 Panels @ 1.25 gpm/Panel 500 gpm

Fluid Composition 50% Glycol/Water
Specific Gravity 1.05 lb/lb
Density 8.33 x 1.05 8.75 lb/gal
Specific Heat (C_p) 0.82 Btu/lb.°F

Collector Capacitance Rate (C_c)
GPM x Density x 60 Min/Hr x C_p =
500 x 8.75 x 60 0.82 = 215,248 Btuh/°F
Heat Transfer at 10°T.D. (165° -155°) = 2,152,480 Btuh

Collector Heat Exchanger Modifier
Heat Exchange Effectiveness (e_s) 75%
Storage Flow Rated Based on 15° TD (155° - 140°)

$$\frac{2,152,480}{15° \times 8.33 \times 60 \times 75\%} = 383 \text{ gpm}$$

Storage Loop Capacitance Rate (C_S)
GPM x Density x 60 Min/Hr x C_p
383 x 8.33 x 60 x 1.0 = 191,500 Btuh/°F

$$X = \frac{C_c}{e_s \times C_S} = \frac{215,248}{0.75 \times 191,500} = 1.499$$

$$Y = \frac{A_C \times F_RU_L}{C_c} = \frac{7,968 \times 0.7}{215,248} = 0.0259$$

Adjusted System Performance:

$$\frac{1}{1 + Y(X-1)} = \frac{1}{1 + 0.0259(1.499 -1)} = 0.986$$

Adjusted $F_R(ta)n$ = 0.69 x 0.986 = 0.680

Adjusted F_RU_L = 0.70 x 0.986 = 0.690

(2) System Performance Factor D_1 for 7,968 sq. ft. Collector System

(a) Collector Tilt Angle - 34°

Month	S	L	S/L	D_1
January	31,341	205.7	1.52	0.82
February	35,868	179.6	2.00	1.08
March	46,283	184.7	2.51	1.36
April	49,440	167.9	2.94	1.59
May	53,258	161.6	3.30	1.79
June	54,930	145.9	3.76	2.04
July	54,436	137.9	3.95	2.14
August	52,545	130.1	4.04	2.19
September	49,020	122.0	4.02	2.18
October	44,578	151.1	2.95	1.60
November	35,760	169.9	2.10	1.14
December	31,310	187.9	1.67	0.90

S - Monthly incident solar radiation on a tilted surface - Btu/Month/sq.ft. - See Table 3. (See page 189)

L - Hot water heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (ta)_n \, 5}{L}$ = 7,968 sq.ft. x 0.680 x S/L = 5,481 S/L

(2) System Performance Factor D_1 for 7,968 sq. ft. Collector System

(b) Collector Tilt Angle - 39°

Month	S	L	S/L	D_1
January	32,333	205.7	1.57	0.85
February	36,120	179.6	2.01	1.09
March	46,686	184.7	2.53	1.37
April	48,960	167.9	2.92	1.58
May	51,522	161.6	3.19	1.73
June	53,070	145.9	3.64	1.97
July	52,638	137.9	3.82	2.07
August	51,491	130.1	3.96	2.15
September	49,020	122.0	4.02	2.18
October	45,570	151.1	3.02	1.64
November	36,660	169.9	2.16	1.17
December	32,395	187.9	1.72	0.93

S - Monthly incident solar radiation on a tilted surface - Btu/Month/sq.ft. - See Table 4. (See page 190)

L - Hot water heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (\tau\alpha)_n S}{L}$ = 7,968 sq.ft. x 0.680 x S /L = 5,418 S/L

(2) System Performance Factor D_1 for 7,968 sq. ft. Collector System

(c) Collector Tilt Angle - 44°

Month	S	L	S/L	D_1
January	33,306	205.7	1.62	0.88
February	36,372	179.6	2.03	1.10
March	46,686	184.7	2.53	1.37
April	47,040	167.9	2.80	1.52
May	49,814	161.6	3.08	1.67
June	51,193	145.9	3.51	1.90
July	50,856	137.9	3.69	2.00
August	50,158	130.1	3.86	2.09
September	48,600	122.0	3.98	2.16
October	45,911	151.1	3.04	1.65
November	37,589	169.9	2.21	1.20
December	33,513	187.9	1.78	0.96

S - Monthly incident solar radiation on a tilted surface - Btu/Month/sq.ft. - See Table 5. (See page 191)

L - Hot water heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (ta)_n S}{L}$ = 7,968 sq.ft. x 0.680 x S/L = 5,418 S/L

(2) System Performance Factor D_1 for 7,968 sq. ft. Collector System

(d) Collector Tilt Angle - 49°

Month	S	L	S/L	D_1
January	34,100	205.7	1.66	0.90
February	36,624	179.6	2.04	1.11
March	46,283	184.7	2.51	1.36
April	46,560	167.9	2.77	1.50
May	47,523	161.6	2.94	1.59
June	48,690	145.9	3.34	1.81
July	48,453	137.9	3.51	1.90
August	48,298	130.1	3.71	2.01
September	47,730	122.0	3.91	2.12
October	46,252	151.1	3.06	1.66
November	38,280	169.9	2.25	1.22
December	34,441	187.9	1.83	0.99

S - Monthly incident solar radiation on a tilted surface - Btu/Month/sq.ft. - See Table 6. (See page 192)

L - Hot water heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (ta)_n S}{L}$ = 7,968 sq.ft. x 0.680 x S/L = 5,418 S/L

(3) Correction Factors for 7,968 sq.ft. Collector System

(a) Storage Mass Capacitance Factor - K_1

Storage Tanks (16,000 gallons) Sized for approximately Twice the Solar Collector Area.

4 @ 72" Diameter x 20 ft. Long

M = Volume Storage x Density

= 16,000 Gallons x 8.75 lbs/gallon

= 140,000 lbs.

Specific Heat (C_p) = 0.82 Btu/lb.°F

$$\frac{M\ C_p}{A_c} = \frac{140{,}000 \times 0.82}{7{,}968} = 14.40$$

K_1 from Figure 2 (See page 203) - 1.02

(b) Hot Water Factor - K_2

Tabulated on monthly basis for average daytime temperature and average cold water supply temperature. See Figure 3. (See page 204)

(4) System Performance Factor D_2 for 7,968 sq. ft. Collector System

Month	t_o °F	212-t_o °F	t_1 Hours/ Month	Cold Water Supply Temp - °F	Hot Water Factor K_2	D_2
January	38	174	744	42	1.01	3.56
February	40	172	672	42	0.99	3.57
March	48	164	744	52	1.16	4.30
April	58	154	720	56	1.19	4.41
May	68	144	744	63	1.26	4.69
June	76	136	720	67	1.33	5.01
July	80	132	744	71	1.40	5.59
August	78	134	744	78	1.65	7.09
September	72	140	720	79	1.71	7.92
October	61	151	744	68	1.45	6.05
November	50	162	720	55	1.21	4.65
December	40	172	744	46	1.07	4.08

t_o - Monthly average daytime temperature

$$D_2 = \frac{A_c\ F_R U_L (212-t_o)\ \text{Hours/Mo} \times K_1 \times K_2}{L}$$

$$= 7{,}968\ \text{sq.ft.} \times 0.690\ (212-t_o) \times \text{Hours/Mo} \times 1.02 \times K_2/L$$

$$= 5{,}608 \times \text{T.D.} \times \text{Hours/Month} \times K_2/L$$

(5) Fraction of Heating Load Supplied by Solar Energy for 7,968 sq. ft. Collector System

(a) Collector Tilt Angle - 34°

Month	L	D_1	D_2	f	E
January	205.7	0.82	3.56	0.50	102.9
February	179.6	1.08	3.57	0.67	120.3
March	184.7	1.36	4.30	0.76	140.4
April	167.9	1.59	4.41	0.85	142.7
May	161.6	1.79	4.69	0.91	147.1
June	145.9	2.04	5.01	0.97	141.5
July	137.9	2.14	5.59	0.98	135.1
August	130.1	2.19	7.09	0.93	121.0
September	122.0	2.18	7.92	0.89	108.6
October	151.1	1.60	6.05	0.78	117.9
November	169.9	1.14	4.65	0.64	108.7
December	187.9	0.90	4.08	0.52	97.7
Total	1,944.3				1,483.9

L - Hot Water Load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{1{,}483.9 \times 10^6}{1{,}944.3 \times 10^6} = 76.32\%$$

(5) Fraction of Heating Load Supplied by Solar Energy for 7,968 sq. ft. Collector System

(b) Collector Tilt Angle - 39°

Month	L	D_1	D_2	f	E
January	205.7	0.85	3.56	0.52	107.0
February	179.6	1.09	3.57	0.67	120.3
March	184.7	1.37	4.30	0.77	142.2
April	167.9	1.58	4.41	0.84	141.0
May	161.6	1.73	4.69	0.89	143.8
June	145.9	1.97	5.01	0.96	140.1
July	137.9	2.07	5.59	0.97	133.8
August	130.1	2.15	7.09	0.92	119.7
September	122.0	2.18	7.92	0.89	108.6
October	151.1	1.64	6.05	0.79	119.4
November	169.9	1.17	4.65	0.66	112.1
December	187.9	0.93	4.08	0.54	101.5
Total	1,944.3				1,489.5

L - Hot Water Load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{1{,}489.5 \times 10^6}{1{,}944.3 \times 10^6} = 76.61\%$$

(5) Fraction of Heating Load Supplied by Solar Energy for 7,968 sq. ft. Collector System

(c) Collector Tilt Angle - 44°

Month	L	D_1	D_2	f	E
January	205.7	0.88	3.56	0.54	111.1
February	179.6	1.10	3.57	0.68	122.1
March	184.7	1.37	4.30	0.77	142.2
April	167.9	1.52	4.41	0.82	137.7
May	161.6	1.67	4.69	0.87	140.6
June	145.9	1.90	5.01	0.92	135.7
July	137.9	2.00	5.59	0.93	128.2
August	130.1	2.09	7.09	0.90	117.1
September	122.0	2.16	7.92	0.88	107.4
October	151.1	1.65	6.05	0.80	120.9
November	169.9	1.20	4.65	0.68	115.5
December	187.9	0.96	4.08	0.56	105.2
Total	1,944.3				1,482.2

L - Hot Water Load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{1,482.2 \times 10^6}{1,944.3 \times 10^6} = 76.23\%$$

(5) Fraction of Heating Load Supplied by Solar Energy for 7,968 sq. ft. Collector System

(d) Collector Tilt Angle - 49°

Month	L	D_1	D_2	f	E
January	205.7	0.90	3.56	0.56	115.2
February	179.6	1.11	3.57	0.68	122.1
March	184.7	1.36	4.30	0.70	140.4
April	167.9	1.50	4.41	0.81	136.0
May	161.6	1.59	4.69	0.84	135.7
June	145.9	1.81	5.01	0.90	131.0
July	137.9	1.90	5.59	0.90	124.1
August	130.1	2.01	7.09	0.88	114.5
September	122.0	2.12	7.92	0.87	106.1
October	151.1	1.66	6.05	0.80	120.9
November	169.9	1.22	4.65	0.69	117.2
December	187.9	0.99	4.08	0.58	109.0
Total	1,944.3				1,472.2

L - Hot Water Load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{1{,}472.2 \times 10^6}{1{,}944.3 \times 10^6} = 75.72\%$$

d) **Analysis Based on the Use of 480 - 34" x 96" Solar Collector Panels**

(1) Collector Data

Collector Area

480 Panels x 19.92 sq.ft./Panel 9,562 sq.ft.

Collector Flow Rate Based on Manufacturer's Data

480 Panels @ 1.25 gpm/Panel - 600 gpm

Storage Sized for Approximately Twice the Solar Collector Area

18,000 gallons

$$D_1 = \frac{A_C F_R (ta)_n S}{L} = 9{,}562 \text{ sq.ft.} \times 0.680 \times S/L$$

$$= 6{,}502\ S/L$$

$$D_2 = A_C F_R U_L\ (212 - t_o) \times \text{Hours/Month} \times K_1 \times K_2/L$$

$$= 9{,}562 \times 0.690 \times (212 - t_o) \times \text{Hours/Month} \times 1.02 \times K_2/L$$

$$= 6{,}730 \times \text{T.D.} \times \text{Hours} \times K_2/L$$

(2) Fraction of Heating Load Supplied by Solar Energy for 9,562 sq. ft. Collector System

(a) Collector Tilt Angle - 34°

Month	L	D1	D2	f	E
January	205.7	0.98	4.27	0.57	117.2
February	179.6	1.30	4.28	0.73	131.1
March	184.7	1.63	5.16	0.83	153.3
April	167.9	1.91	5.29	0.92	154.5
May	161.6	2.15	5.63	0.98	158.4
June	145.9	2.45	6.01	1.0	145.9
July	137.9	2.57	6.71	1.0	137.9
August	130.1	2.63	8.51	0.98	127.5
September	122.0	2.62	9.50	0.94	114.7
October	151.1	1.92	7.26	0.85	128.4
November	169.9	1.37	5.58	0.71	120.6
December	187.9	1.08	4.90	0.59	110.9
Total	1,944.3				1,600.4

L - Hot water load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy

$$\frac{1{,}600.4 \times 10^6}{1{,}944.3 \times 10^6} = 82.31\%$$

(2) Fraction of Heating Load Supplied by Solar Energy for 9,562 sq. ft. Collector System

(b) Collector Tilt Angle - 39°

Month	L	D_1	D_2	f	E
January	205.7	1.02	4.27	0.60	123.4
February	179.6	1.31	4.28	0.74	132.9
March	184.7	1.64	5.16	0.84	155.1
April	167.9	1.90	5.29	0.91	152.8
May	161.6	2.08	5.63	0.96	155.1
June	145.9	2.36	6.01	1.0	145.9
July	137.9	2.48	6.71	1.0	137.9
August	130.1	2.58	8.51	0.98	127.5
September	122.0	2.62	9.50	0.9	115.9
October	151.1	1.97	7.26	0.86	129.9
November	169.9	1.40	5.58	0.73	124.0
December	187.9	1.12	4.90	0.61	114.6
Total	1,944.3				1,615.0

L - Hot water load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy

$$\frac{1,615.0 \times 10^6}{1,944.3 \times 10^6} = 83.06\%$$

(2) Fraction of Heating Load Supplied by Solar Energy for 9,562 sq. ft. Collector System

(c) Collector Tilt Angle - 44°

Month	L	D_1	D_2	f	E
January	205.7	1.06	4.27	0.61	125.5
February	179.6	1.32	4.28	0.74	132.9
March	184.7	1.64	5.16	0.84	155.1
April	167.9	1.82	5.29	0.89	147.8
May	161.6	2.00	5.63	0.93	150.3
June	145.9	2.28	6.01	1.0	145.9
July	137.9	2.40	6.71	1.0	137.9
August	130.1	2.51	8.51	0.96	124.9
September	122.0	2.59	9.50	0.95	115.9
October	151.1	1.98	7.26	0.86	129.9
November	169.9	1.44	5.58	0.75	127.4
December	187.9	1.15	4.90	0.62	116.5
Total	1,944.3				1,610.0

L - Hot water load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy

$$\frac{1,610.0 \times 10^6}{1,944.3 \times 10^6} = 82.81\%$$

(2) Fraction of Heating Load Supplied by Solar Energy for 9,562 sq. ft. Collector System

(d) Collector Tilt Angle - 49°

Month	L	D_1	D_2	f	E
January	205.7	1.08	4.27	0.62	127.5
February	179.6	1.33	4.28	0.75	134.7
March	184.7	1.63	5.16	0.83	153.3
April	167.9	1.80	5.29	0.87	146.1
May	161.6	1.91	5.63	0.90	145.4
June	145.9	2.17	6.01	0.97	141.5
July	137.9	2.28	6.71	0.97	133.8
August	130.1	2.41	8.51	0.94	122.3
September	122.0	2.54	9.50	0.93	113.5
October	151.1	1.99	7.26	0.87	131.5
November	169.9	1.46	5.58	0.76	129.1
December	187.9	1.19	4.90	0.64	120.3
Total	1,944.3				1,599.0

L - Hot water load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy

$$\frac{1{,}599.0 \times 10^6}{1{,}944.3 \times 10^6} = 82.24\%$$

2) Part II - Heating and Domestic Hot Water Analysis with the Use of Flat Plate Solar Collectors

(a) Heating Load

Building heating load served by two steam to hot water heat exchangers located at ground floor. Present radiation is heated with 210°F water. The analysis is based on increasing radiation and supplying 155°F water.

Capacity of Heat Exchangers

Heats a total of 540 gpm from 170° to 210°

$$540 \text{ gpm } (210° - 170°) 8.33 \times 60 = 10.8 \times 10^6 \text{ Btuh}$$

$$= 8,100,000 \text{ Btuh}$$

Building Heat Loss

Heat Exchanger Effectiveness = 75%

$$10.8 \times 10^6 \text{ Btuh} \times 75\% = 8.1 \times 10^6 \text{ Btuh}$$

Annual Heating Energy $\qquad \dfrac{H_L \times D \times 24 \times C_D \times C_N}{T.D.}$

H_L = Heat Loss Btu/Hr - 8,100,000 Btuh
D = Degree Days - 4,224
TD = 70°F - 10°F = 60°F
C_D = Factor for +10°F Outside Temperature
C_N = Adjustment for Night Setback - 0.80

$$E = \frac{8.1 \times 10^6 \times 4,224 \times 24}{60} \times 0.79 \times 0.80$$

$$= 8,647 \times 10^6 \text{ Btu}$$

(b) Hot Water and Heating Load - Btu x 10^6

Month	Heating	Hot Water	Total (L)
January	1,841.8	205.7	2,047.5
February	1,617.0	179.6	1,796.6
March	1,314.3	184.7	1,499.0
April	475.6	167.9	643.5
May	--	161.6	161.6
June	--	145.9	145.9
July	--	145.9	145.9
August	--	137.9	137.9
September	--	130.1	130.1
October	69.2	122.0	191.2
November	458.3	151.1	609.4
December	1,098.2	169.9	1,268.1
	1,772.6	187.9	1,960.5
Total	8,647.0	1,944.3	10,591.3

(c) Analysis with 950 - 34" x 96" Solar Collector Panels

(1) Collector Combined Performance Characteristics - Flat Plate Solar Collectors

Intercept $b = F_R(ta)_n$ = 0.69 (See Figure 1)

Slope $m = F_R U_L$ = 0.70 (See Figure 1)

Collector Area (A_C)
950 Panels @ 19.92 sq.ft/Panel 18,924 sq.ft.

Collector Flow Rate - Based on Manufacturer's Data
950 Panels @ 1.25 gpm per Panel 1,188 gpm

Fluid Composition 50% Glycol/Water
Specific Gravity 1.05 lb/lb
Density 8.33 x 1.05 8.75 lb/gal
Specific Heat (C_p) 0.82 Btu/lb.°F

Collector Capacitance Rate (C_C)
GPM x Density x 60 Min/Hr x C_p =
1,188 x 8.75 x 60 x 0.82 511,434 Btuh/°F
Heat Transfer at 10° TD (165° - 155°) = 5,114,340 Btuh

Collector Heat Exchanger Modifier
Heat Exchange Effectiveness (e_S) 75%
Storage Flow Rated Based on 15° TD (155° - 140°)

$$\frac{5,114,340}{150 \times 8.33 \times 60 \times 75\%} = 910 \text{ gpm}$$

Storage Loop Capacitance Rate (C_S)
GPM x Density x 60 Min/Hr x C_p
910 x 8.33 x 60 x 1.0 = 455,000 Btuh/°F

$$X = \frac{C_C}{e_S \times C_S} = \frac{511,434}{0.75 \times 455,000} = 1.50$$

$$Y = \frac{A_C \times F_R U_L}{C_C} = \frac{18,924 \times 0.7}{511,434} = 0.0259$$

Adjusted System Performance:

$$\frac{1}{1 + Y(X-1)} \quad \frac{1}{1 + 0.0259(1.50 - 1)} = 0.985$$

Adjusted $F_R(ta)n$ = 0.69 x 0.985 = 0.680

Adjusted $F_R U_L$ = 0.70 x 0.985 = 0.690

(2) System Performance Factor D_1 for 18,924 sq.ft. Collector System

(a) Collector Tilt Angle - 39°

Month	S	L	S/L	D_1
January	32,333	2,047.5	0.148	0.190
February	36,120	1,796.6	0.201	0.259
March	46,686	1,499.0	0.311	0.400
April	48,960	643.5	0.761	0.979
May	51,522	161.6	3.19	4.10
June	53,070	145.9	3.64	4.68
July	52,638	137.9	3.82	4.92
August	51,491	130.1	3.96	5.10
September	49,020	191.2	2.56	3.29
October	45,570	609.4	0.748	0.963
November	36,660	1,268.1	0.289	0.372
December	32,395	1,960.5	0.165	0.212

S - Monthly incident solar radiation on a tilted surface - Btu/Month/Sq.Ft. - See Table 4. (See page 190)

L - Hot water and heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (ta)_n S}{L}$ = 18,924 sq.ft. x 0.680 x S /L = 12,868 S/L

(2) System Performance Factor D_1 for 18,924 sq.ft. Collector System

(b) Collector Tilt Angle - 44°

Month	S	L	S/L	D_1
January	33,306	2,047.5	0.163	0.210
February	36,372	1,796.6	0.202	0.260
March	46,686	1,499.0	0.311	0.400
April	47,040	643.5	0.731	0.941
May	49,814	161.6	3.08	3.96
June	51,193	145.9	3.51	4.52
July	50,856	137.9	3.69	4.75
August	50,158	130.1	3.86	4.97
September	48,600	191.2	2.54	3.27
October	45,911	609.4	0.753	0.969
November	37,589	1,268.1	0.296	0.381
December	33,513	1,960.5	0.171	0.220

S - Monthly incident solar radiation on a tilted surface - Btu/Month/Sq.Ft. - See Table 5. (See page 191)

L - Hot water and heating load - Btu/Month x 10^6.

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (\tau\alpha)_n S}{L}$ = 18,924 sq.ft. x 0.680 x S /L = 12,868 S/L

(2) System Performance Factor D_1 for 18,924 sq.ft. Collector System

(c) Collector Tilt Angle - 49°

Month	S	L	S/L	D_1
January	34,100	2,047.5	0.167	0.215
February	36,624	1,796.6	0.204	0.263
March	46,283	1,499.0	0.309	0.398
April	46,560	643.5	0.724	0.932
May	47,523	161.6	2.94	3.78
June	48,690	145.9	3.34	4.30
July	48,453	137.9	3.51	4.52
August	48,298	130.1	3.71	4.77
September	47,730	191.2	2.50	3.22
October	46,252	609.4	0.759	0.977
November	38,280	1,268.1	0.302	0.389
December	34,441	1,960.5	0.176	0.226

S - Monthly incident solar radiation on a tilted surface - Btu/Month/Sq.Ft. - See Table 6. (See page 192)

L - Hot water and heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (ta)_n S}{L}$ = 18,924 sq.ft. x 0.680 x S /L = 12,868 S/L

(2) System Performance Factor D_1 for 18,924 sq.ft. Collector System

(d) Collector Tilt Angle - 54°

Month	S	L	S/L	D_1
January	34,472	2,047.5	0.168	0.216
February	26,876	1,796.6	0.205	0.264
March	45,911	1,499.0	0.306	0.394
April	45,120	643.5	0.701	0.902
May	45,229	161.6	2.80	3.60
June	45,570	145.9	3.12	4.01
July	45,477	137.9	3.30	4.25
August	46,159	130.1	3.55	4.57
September	46,860	191.2	2.45	3.15
October	46,252	609.4	0.759	0.977
November	38,730	1,268.1	0.305	0.392
December	34,813	1,960.5	0.178	0.229

S - Monthly incident solar radiation on a tilted surface - Btu/Month/Sq.Ft. - See Table 7. (See page 193)

L - Hot water and heating load - Btu/Month x 10^6

S/L - Ratio x 10^{-4}

D_1 - $\frac{A_C F_R (ta)_n S}{L}$ = 18,924 sq.ft. x 0.680 x S /L = 12,868 S/L

(3) Correction Factors for 18,924 sq.ft. Collector System

(a) Storage Mass Capacitance Factor - K_1

Storage Tanks (38,000 Gallons) Sized for Approximately Twice the Solar Collector Area

4 @ 96" Diameter x 26 ft. Long

M = Volume Storage x Density

= 38,000 Gallons x 8.75 lbs/gallon

= 332,500 lbs.

Specific Heat (C_p) = 0.82 Btu/Lb°F

$$\frac{M\ C_p}{A_c} = \frac{332,500 \times 0.82}{18,924} = 14.4$$

K_1 from Figure 2 (See page 203) - 1.02

(b) Hot Water Factor - K_2

Tabulated on monthly basis for average daytime temperature and average cold water supply temperature. See Figure 3. (See page 204)

(4) System Performance Factor D_2 for 18,924 sq.ft. Collector System

Month	t_o °F	$212-t_o$ °F	t_1 Hours/ Month	Cold Water Supply Temp - °F	Hot Water Factor K_2	D_2
January	38	174	744	42	1.01	0.84
February	40	172	672	42	0.99	0.85
March	48	164	744	52	1.16	1.25
April	58	154	720	56	1.19	2.73
May	68	144	744	63	1.26	11.12
June	76	136	720	67	1.33	11.88
July	80	132	744	71	1.40	13.28
August	78	134	744	78	1.65	16.84
September	72	140	720	79	1.71	12.01
October	61	151	744	68	1.45	3.56
November	50	162	720	55	1.21	1.48
December	40	172	744	46	1.07	0.93

---

t_o - Monthly average daytime temperature

$$D_2 - \frac{A_C\ F_R U_L (212-t_o) \text{Hours/Month} \times K_1 \times K_2}{L}$$

$$= 18{,}924 \text{ sq.ft.} \times 0.690\ (212-t_o \times \text{Hours/Mo} \times 1.02 \times K_2/L$$

$$= 13{,}319 \times \text{T.D.} \times \text{Hours/Month} \times K_2/L$$

(5) Fraction of Heating Load Supplied by Solar Energy for 18,924 sq.ft. Collector System

(a) Collector Tilt Angle - 39°

Month	L	D_1	D_2	f	E
January	2,047.5	0.190	0.84	0.14	286.7
February	1,796.6	0.259	0.85	0.18	323.4
March	1,499.0	0.400	1.25	0.30	449.7
April	643.5	0.979	2.73	0.64	411.8
May	161.6	4.10	11.12	1.0	161.6
June	145.9	4.68	11.88	1.0	145.9
July	137.9	4.92	13.28	1.0	137.9
August	130.1	5.10	16.84	1.0	130.1
September	191.2	3.29	12.01	1.0	191.2
October	690.4	0.963	3.56	0.57	393.5
November	1,268.1	0.372	1.48	0.26	329.7
December	1,960.5	0.212	0.93	0.16	313.7
Total	10,591.3				3,275.2

L - Hot water and heating load - Btu/Month x 10^6

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{3,275.2 \times 10^6}{10,591.3 \times 10^6} = 30.92\%$$

(5) Fraction of Heating Load Supplied by Solar Energy for 18,924 sq.ft. Collector System

(b) Collector Tilt Angle - 44°

Month	L	D_1	D_2	f	E
January	2,047.5	0.210	0.84	0.16	327.6
February	1,796.6	0.260	0.85	0.18	323.4
March	1,499.0	0.400	1.25	0.30	449.7
April	643.5	0.941	2.73	0.62	399.0
May	161.6	3.96	11.12	1.0	161.6
June	145.9	4.52	11.88	1.0	145.9
July	137.9	4.75	13.28	1.0	137.9
August	130.1	4.97	16.84	1.0	130.1
September	191.2	3.27	12.01	1.0	191.2
October	690.4	0.969	3.56	0.58	400.4
November	1,268.1	0.381	1.48	0.27	342.4
December	1,960.5	0.220	0.93	0.17	333.3
Total	10,591.3				3,342.5

L - Hot water and heating load - Btu/Month x 10^6

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{3{,}342.5 \times 10^6}{10{,}591.3 \times 10^6} = 31.56\%$$

(5) Fraction of Heating Load Supplied by Solar Energy for 18,924 sq.ft. Collector System

(c) Collector Tilt Angle - 49°

Month	L	D_1	D_2	f	E
January	2,047.5	0.215	0.84	0.17	348.1
February	1,796.6	0.263	0.85	0.19	341.4
March	1,499.0	0.398	1.25	0.29	434.7
April	643.5	0.932	2.73	0.61	392.5
May	161.6	3.78	11.12	1.0	161.6
June	145.9	4.30	11.88	1.0	145.9
July	137.9	4.52	13.28	1.0	137.9
August	130.1	4.77	16.84	1.0	130.1
September	191.2	3.22	12.01	1.0	191.2
October	690.4	0.977	3.56	0.59	407.3
November	1,268.1	0.389	1.48	0.28	355.1
December	1,960.5	0.226	0.93	0.18	352.9
Total	10,591.3				3,398.7

L - Hot water and heating load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{3,398.7 \times 10^6}{10,591.3 \times 10^6} = 32.09\%$$

(5) Fraction of Heating Load Supplied by Solar Energy for 18,924 sq.ft. Collector System

(d) Collector Tilt Angle - 54°

Month	L	D_1	D_2	f	E
January	2,047.5	0.216	0.84	0.17	348.1
February	1,796.6	0.264	0.85	0.19	341.4
March	1,499.0	0.394	1.25	0.28	419.7
April	643.5	0.902	2.73	0.59	379.7
May	161.6	3.60	11.12	1.0	161.6
June	145.9	4.01	11.88	1.0	145.9
July	137.9	4.25	13.28	1.0	137.9
August	130.1	4.57	16.84	1.0	130.1
September	191.2	3.15	12.01	0.98	187.4
October	690.4	0.977	3.56	0.59	407.3
November	1,268.1	0.392	1.48	0.28	355.1
December	1,960.5	0.229	0.93	0.18	352.9
Total	10,591.3				3,367.1

L - Hot water and heating load - Btu/Month x 10^6.

f - Monthly fraction of heat load supplied by solar energy. See Figure 4. (See page 205)

E - Solar energy supplied per month - Btu/Month x 10^6 (L x f)

Yearly fraction of total heating supplied by solar energy:

$$\frac{3,367.1 \times 10^6}{10,591.3 \times 10^6} = 31.79\%$$

3) Part III - Heating and Domestic Hot Water Analysis with the Use of Concentrating Solar Collectors

Heating of Building Radiation with 210° Hot Water

358 - 8'-0" x 10'-0" Solar Collector Units
Collector Area - 358 @ 38.88 sq.ft. = 13,920 sq.ft.
Collector Flow Rate - Based on Manufacturer's Data
358 Units @ 1.6 gpm/unit - 573 gpm
Storage - 28,000 gallons

(a) Heating and Hot Water Analysis

Month	Total (L) Btu x 10^6	S_B Btu/Month/ Sq. Ft.	f Collector Efficiency	E Btu x 10^6
January	2,047.5	29,791	49.9%	206.9
February	1,796.6	33,964	51.2%	242.1
March	1,499.0	43,369	54.0%	326.0
April	643.5	44,280	58.0%	357.5
May	161.6	45,508	61.0%	161.6
June	145.9	46,230	62.3%	145.9
July	137.9	45,694	62.4%	137.9
August	130.1	45,260	62.0%	130.1
September	191.2	44,520	61.5%	191.2
October	609.4	42,284	58.4%	343.7
November	1,268.1	34,410	53.5%	256.3
December	1,960 5	30,597	50.7%	215.9
Total	10,591.3			2,814.8

L - Hot water and heating load - Btu/Month x 10^6.

S_B - Monthly incident solar beam radiation. See Table

Collector Efficiency - See page 181.

E - Solar energy supplied per month - S_B x f x 13,920 sq.ft.

Yearly fraction of total heating supplied by solar energy:

$$\frac{2,814.8 \times 10^6}{10,591.3 \times 10^6} = 26.58\%$$

(b) Solar Energy Supplied for Heating, Domestic Hot Water with 13,920 sq.ft. Concentrating Solar Collector System Tilt Angle 39°

Month	t_o °F	t_w °F	I_B Btu/Day/ Sq. Ft.	Useful Solar Hours/Day	I_{BH} Btu/Hr/ Sq. Ft.	f Collector Efficiency
January	38	220	961	5	192	49.9%
February	40	220	1,213	6	202	51.2%
March	48	200	1,399	7	200	54.0%
April	58	180	1,476	7	211	58.0%
May	68	160	1,468	7	210	61.0%
June	76	160	1,541	7	220	62.3%
July	80	160	1,474	7	211	62.4%
August	78	160	1,460	7	209	62.0%
September	72	160	1,484	7	212	61.5%
October	61	180	1,364	7	195	58.4%
November	50	200	1,147	6	191	53.5%
December	40	220	987	5	197	50.7%

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t_o - Average ambient temperature

t_w - Average water temperature expected in the collectors based on building system requirement.

I_B - Beam radiation. See Table 15.

Useful Solar Hours - All hours above 200 Btu/Hr.

I_{BH} - Beam radiation per hour of useful solar collection.

Collector Efficiency - Obtained from manufacturer's data.
$0.706 - 0.218(t_w - t_o)$/Beam Radiation/Hr. sq.ft.

4) Part IV - Heating, Domestic Hot Water and Air Conditioning Analysis with the Use of Concentrator Solar Collectors

Heating of Building Radiation with 210° Water and Absorption Air Conditioning with 235° Water.

358 - 8'-0" x 10'-0" Solar Collector Units
Collector Area - 358 @ 38.88 sq.ft. = 13,920 sq.ft.
Collector Flow Rate - 573 gpm
Storage - 28,000 gallons

The total building air conditioning load is 1,200 tons with chilled water purchased from General Services Administration.

The analysis is based on the installation of part cooling with an absorption chiller with a capacity of 150 tons.

Based on ASHRAE Guide, office buildings in Washington, D.C. have 700 to 1,200 full load hours of summer operation for total air conditioning. With the use of partial air conditioning equipment, the absorption unit will operate continuously during the season or 1,600 hours.

(a) Annual Cooling Load Hours:

Annual Cooling Load -
150 tons x 1,600 hours = 240,000 ton hours

Absorption Air Conditioning Energy Requirement
240,000 ton hours x 18,500 Btu/ton hour
= $4{,}440 \times 10^6$ Btu

(b) Heating, Hot Water and Air Conditioning Load

Month	Heating and Hot Water Btu x 10^6	Air Conditioning Btu x 10^6	Total (L) Btu x 10^6
January	2,047.5	---	2,047.5
February	1,796.6	---	1,796.6
March	1,499.0	---	1,499.0
April	643.5	---	643.5
May	161.6	408.5	570.1
June	145.9	652.7	798.6
July	137.9	1,003.4	1,141.3
August	130.1	1,087.8	1,217.9
September	191.2	1,003.4	1,194.6
October	609.4	284.2	893.6
November	1,268.1	---	1,268.1
December	1,960.5	---	1,960.5
Total	10,591.3	4,440.0	15,031.3

Heating and hot water loads - See page 168.

(c) Heating, Hot Water and Air Conditioning Analysis

Month	Total (L) Btu x 10^6	S_B Btu/Month/ Sq. Ft.	f Collector Efficiency	E Btu x 10^6
January	2,047.5	29,791	49.9%	206.9
February	1,796.6	33,964	51.2%	242.1
March	1,499.0	43,369	54.0%	326.0
April	643.5	44,280	58.0%	357.5
May	570.1	45,508	54.8%	347.1
June	798.6	46,230	54.8%	352.7
July	1,141.3	45,694	53.6%	340.9
August	1,217.9	45,260	53.2%	335.2
September	1,194.6	44,520	53.8%	333.4
October	893.6	42,284	58.4%	343.7
November	1,268.1	34,410	53.5%	256.3
December	1,960.5	30,597	50.7%	215.9
Total	15,031.3			3,657.7

L - Hot Water, Heating and Air Conditioning Load - Btu/Month x 10^6

S_B - Monthly incident solar beam radiation. See Table 15

f - Collector Efficiency. See page 185.

E - Solar energy supply per month:
S_B x Collector Efficiency x 13,920 sq.ft. collector area

Yearly Fraction of total energy supplied by solar radiation

$$\frac{3,657.7 \times 10^6}{15,031.3 \times 10^6} = 24.33\%$$

Summer fraction of total energy supplied by solar radiation (May thru September)

$$\frac{1,709.3}{4,922.7} = 34.72\%$$

(d) Solar Energy Supplied for Heating, Domestic Hot Water, and Air Conditioning with 13,920 sq.ft. Concentrating Solar Collector System - Tilt Angle 39°

Month	t_o °F	t_w °F	I_B Btu/Day/ Sq. Ft.	Useful Solar Hours/Day	I_{BH} Btu/Hr/ Sq. Ft.	f Collector Efficiency
January	38	220	961	5	192	49.9%
February	40	220	1,213	6	202	51.2%
March	48	200	1,399	7	200	54.0%
April	58	180	1,476	7	211	58.0%
May	68	220	1,468	7	210	54.8%
June	76	235	1,541	7	220	54.8%
July	80	245	1,474	7	211	53.6%
August	78	245	1,460	7	209	53.2%
September	72	235	1,484	7	212	53.8%
October	61	180	1,364	7	195	58.4%
November	50	200	1,147	6	191	53.5%
December	40	220	987	5	197	50.7%

---

t_o - Average ambient temperature

t_w - Average water temperature expected in the collectors based on building system requirement.

I_B - Beam radiation. See Table 15.

Useful Solar Hours - All hours above 200 Btu/Hr.

I_{BH} - Beam radiation per hour of useful solar collection.

Collector Efficiency - Obtained from manufacturer's data.
$0.706 - 0.218(t_w - t_o)$ /Beam Radiation/Hr. sq.ft.

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SECTION VI

Tables and Figures

VI. Tables and Figures

1. Tables 1 thru 7 provide monthly incident solar radiation for Washington, D.C. area for solar tilt angles of 24°, 29°, 34°, 44°, 49°, 54° as utilized in the various analyses that follow. Data obtained from ASHRAE Application of Solar Energy for Heating and Cooling of Buildings, 1977.

2. Tables 8 thru 14 provide ratios of monthly average daily radiation for the Washington, D.C. area for various solar tilt angles and various monthly averages of daily radiation on horizontal surfaces to the extra terrestrial radiation transmitted thru the atmosphere. The factor R accounts for the three components of radiation incident on the collector surface; beam, sky diffusion, and ground reflected. Data obtained from HUD Solar Heating and Domestic Hot Water, 1977.

3. Table 15 develops the monthly incident solar beam component on a tilted surface as required with concentrating solar collectors with deductions for diffused radiation and ground reflectance. The collector tilt angle is installed at latitude angle, since the collector tracks the sun. Information obtained from Table 4 as adjusted by data from ASHRAE Guide.

4. Figure 1 is provided to illustrate the variations of thermal efficiencies of flat plate solar collectors utilized in the analyses. This may vary between manufacturers.

5. Figure 2 is provided to determine storage mass capacitance correction factors for various storage capacities as used with flat plate solar collectors. Plotted from HUD Solar Heating and Domestic Hot Water, 1977.

6. Figure 3 is provided to determine hot water factors for various average daytime temperatures and cold water supply temperature as used with flat plate solar collectors. Plotted from HUD Solar Heating and Domestic Hot Water, 1977.

7. Figure 4 is provided to determine solar collector efficiency based on system performance factors. Plotted from f charts as developed by S.A. Klein of the Solar Energy Laboratory, University of Wisconsin.

READEX FICHE

TABLE 1
TOTAL MONTHLY SOLAR RADIATION AVAILABLE WITH COLLECTOR TILT ANGLE OF 24°

Month	I_H Btu/Day/ sq.ft.	K_T ---	R ---	I_T Btu/Day/ sq.ft.	N ---	S Btu/Mo/ sq.ft.
January	632	0.445	1.47	929	31	28,799
February	902	0.470	1.32	1,191	28	33,348
March	1,255	0.496	1.18	1,481	31	45,911
April	1,600	0.504	1.05	1,680	30	50,400
May	1,847	0.516	0.97	1,792	31	55,552
June	2,081	0.553	0.94	1,956	30	58,680
July	1,930	0.524	0.96	1,853	31	57,443
August	1,712	0.516	1.02	1,746	31	54,126
September	1,446	0.520	1.12	1,620	30	48,600
October	1,081	0.506	1.28	1,384	31	42,904
November	764	0.464	1.42	1,085	30	32,550
December	594	0.460	1.53	909	31	28,179

I_H - Monthly average of daily radiation incident on horizontal surface.

K_T - Ratio of monthly averages of daily radiation on horizontal surface to the extra terrestrial radiation transmitted thru the atmosphere.

R - Ratio of monthly average daily radiation on a tilted surface to that on a horizontal surface based on Washington, D.C. latitude of 38° -51'N with collector tilt angle of 24° latitude. Tilt angle = +15°. Interpolated from Table 8.

I_T - Monthly average of daily radiation incident normal to a tilted surface (I_H x R)

N - Number of days per month.

S - Monthly incident solar radiation on a tilted surface (I_T x N) for Washington, D.C.

TABLE 2

TOTAL MONTHLY SOLAR RADIATION AVAILABLE WITH COLLECTOR TILT ANGLE OF 29°

Month	I_H Btu/Day/ sq.ft.	K_T ---	R ---	I_T Btu/Day/ sq.ft.	N ---	S Btu/Mo/ sq.ft.
January	632	0.445	1.54	973	31	30,163
February	902	0.470	1.36	1,227	28	34,356
March	1,255	0.496	1.19	1,493	31	46,283
April	1,600	0.504	1.04	1,664	30	49,920
May	1,847	0.516	0.95	1,755	31	54,405
June	2,081	0.553	0.91	1,894	30	56,820
July	1,930	0.524	0.94	1,814	31	56,234
August	1,712	0.516	1.01	1,729	31	53,599
September	1,446	0.520	1.12	1,620	30	48,600
October	1,081	0.506	1.30	1,405	31	43,555
November	764	0.464	1.50	1,146	30	34,380
December	594	0.460	1.63	968	31	30,008

I_H - Monthly average of daily radiation incident on horizontal surface.

K_T - Ratio of monthly averages of daily radiation on horizontal surface to the extra terrestrial radiation transmitted thru the atmosphere.

R - Ratio of monthly average daily radiation on a tilted surface to that on a horizontal surface based on Washington, D.C. latitude of 38° -51'N with collector tilt angle of 29° latitude. Tilt angle = +10°. Interpolated from Table 9.

I_T - Monthly average of daily radiation incident normal to a tilted surface (I_H x R)

N - Number of days per month.

S - Monthly incident solar radiation on a tilted surface (I_T x N) for Washington, D.C.

TABLE 3
TOTAL MONTHLY SOLAR RADIATION AVAILABLE WITH COLLECTOR TILT ANGLE OF 34°

Month	I_H Btu/Day/ sq.ft.	K_T ---	R ---	I_T Btu/Day/ sq.ft.	N ---	S Btu/Mo/ sq.ft.
January	632	0.445	1.60	1,011	31	31,341
February	902	0.470	1.42	1,281	28	35,868
March	1,255	0.496	1.19	1,493	31	46,283
April	1,600	0.504	1.03	1,648	30	49,440
May	1,847	0.516	0.93	1,718	31	53,258
June	2,081	0.553	0.88	1,831	30	54,930
July	1,930	0.524	0.91	1,756	31	54,436
August	1,712	0.516	0.99	1,659	31	52,545
September	1,446	0.520	1.13	1,634	30	49,020
October	1,081	0.506	1.33	1,438	31	44,578
November	764	0.464	1.56	1,192	30	35,760
December	594	0.460	1.70	1,010	31	31,310

I_H - Monthly average of daily radiation incident on horizontal surface.

K_T - Ratio of monthly averages of daily radiation on horizontal surface to the extra terrestrial radiation transmitted thru the atmosphere.

R - Ratio of monthly average daily radiation on a tilted surface to that on a horizontal surface based on Washington, D.C. latitude of 38° -51'N with collector tilt angle of 34° latitude. Tilt angle = +5°. Interpolated from Table 10.

I_T - Monthly average of daily radiation incident normal to a tilted surface ($I_H \times R$)

N - Number of days per month.

S - Monthly incident solar radiation on a tilted surface ($I_T \times N$) for Washington, D.C.

TABLE 4

TOTAL MONTHLY SOLAR RADIATION AVAILABLE WITH COLLECTOR TILT ANGLE OF 39°

Month	I_H Btu/Day/ sq.ft.	K_T ---	R ---	I_T Btu/Day/ sq.ft.	N ---	S Btu/Mo/ sq.ft.
January	632	0.445	1.65	1,043	31	32,333
February	902	0.470	1.43	1,290	28	36,120
March	1,255	0.496	1.20	1,506	31	46,686
April	1,600	0.504	1.02	1,632	30	48,960
May	1,847	0.516	0.90	1,662	31	51,522
June	2,081	0.553	0.85	1,769	30	53,070
July	1,930	0.524	0.88	1,698	31	52,638
August	1,712	0.516	0.97	1,661	31	51,491
September	1,446	0.520	1.13	1,634	30	49,020
October	1,081	0.506	1.36	1,470	31	45,570
November	764	0.464	1.60	1,222	30	36,660
December	594	0.460	1.76	1,045	31	32,395

I_H - Monthly average of daily radiation incident on horizontal surface.

K_T - Ratio of monthly averages of daily radiation on horizontal surface to the extra terrestrial radiation transmitted thru the atmosphere.

R - Ratio of monthly average daily radiation on a tilted surface to that on a horizontal surface based on Washington, D.C. latitude of 38° -51'N with collector tilt angle of latitude. Tilt angle = 0°. Interpolated from Table 11.

I_T - Monthly average of daily radiation incident normal to a tilted surface ($I_H \times R$)

N - Number of days per month.

S - Monthly incident solar radiation on a tilted surface ($I_T \times N$) for Washington, D.C.

TABLE 5

TOTAL MONTHLY SOLAR RADIATION AVAILABLE WITH COLLECTOR TILT ANGLE OF 44°

Month	I_H Btu/Day/ sq.ft.	K_T ---	R ---	I_T Btu/Day/ sq.ft.	N ---	S Btu/Mo/ sq.ft.
January	632	0.445	1.70	1,074	31	33,306
February	902	0.470	1.44	1,299	28	36,372
March	1,255	0.496	1.20	1,506	31	46,686
April	1,600	0.504	0.98	1,568	30	47,040
May	1,847	0.516	0.87	1,607	31	49,814
June	2,081	0.553	0.82	1,706	30	51,193
July	1,930	0.524	0.85	1,641	31	50,856
August	1,712	0.516	0.94	1,618	31	50,158
September	1,446	0.520	1.12	1,620	30	48,600
October	1,081	0.506	1.37	1,481	31	45,911
November	764	0.464	1.64	1,253	30	37,589
December	594	0.460	1.82	1,081	31	33,513

I_H - Monthly average of daily radiation incident on horizontal surface.

K_T - Ratio of monthly averages of daily radiation on horizontal surface to the extra terrestrial radiation transmitted thru the atmosphere.

R - Ratio of monthly average daily radiation on a tilted surface to that on a horizontal surface based on Washington, D.C. latitude of 38° -51'N with collector tilt angle of latitude. Tilt angle = -5°. Interpolated from Table 12.

I_T - Monthly average of daily radiation incident normal to a tilted surface (I_H x R)

N - Number of days per month.

S - Monthly incident solar radiation on a tilted surface (I_T x N) for Washington, D.C.

TABLE 6
TOTAL MONTHLY SOLAR RADIATION AVAILABLE WITH COLLECTOR TILT ANGLE OF 49°

Month	I_H Btu/Day/ sq.ft.	K_T ---	R ---	I_T Btu/Day/ sq.ft.	N ---	S Btu/Mo/ sq.ft.
January	632	0.445	1.74	1,100	31	34,100
February	902	0.470	1.45	1,308	28	36,624
March	1,255	0.496	1.19	1,493	31	46,283
April	1,600	0.504	0.97	1,552	30	46,560
May	1,847	0.516	0.83	1,533	31	47,523
June	2,081	0.553	0.78	1,623	30	48,690
July	1,930	0.524	0.81	1,563	31	48,453
August	1,712	0.516	0.91	1,558	31	48,298
September	1,446	0.520	1.10	1,591	30	47,730
October	1,081	0.506	1.38	1,492	31	46,252
November	764	0.464	1.67	1,276	30	38,280
December	594	0.460	1.87	1,111	31	34,441

I_H - Monthly average of daily radiation incident on horizontal surface.

K_T - Ratio of monthly averages of daily radiation on horizontal surface to the extra terrestrial radiation transmitted thru the atmosphere.

R - Ratio of monthly average daily radiation on a tilted surface to that on a horizontal surface based on Washington, D.C. latitude of 38° -51'N with collector tilt angle of latitude. Tilt angle = -10°. Interpolated from Table 13.

I_T - Monthly average of daily radiation incident normal to a tilted surface (I_H x R)

N - Number of days per month.

S - Monthly incident solar radiation on a tilted surface (I_T x N) for Washington, D.C.

TABLE 7
TOTAL MONTHLY SOLAR RADIATION AVAILABLE WITH COLLECTOR TILT ANGLE OF 54°

Month	I_H Btu/Day/ sq.ft.	K_T ---	R ---	I_T Btu/Day/ sq.ft.	N ---	S Btu/Mo/ sq.ft.
January	632	0.445	1.76	1,112	31	34,472
February	902	0.470	1.46	1,317	28	36,876
March	1,255	0.496	1.18	1,481	31	45,911
April	1,600	0.504	0.94	1,504	30	45,120
May	1,847	0.516	0.79	1,459	31	45,229
June	2,081	0.553	0.73	1,519	30	45,570
July	1,930	0.524	0.76	1,467	31	45,477
August	1,712	0.516	0.87	1,489	31	46,159
September	1,446	0.520	1.08	1,562	30	46,860
October	1,081	0.506	1.38	1,492	31	46,252
November	764	0.464	1.69	1,291	30	38,730
December	594	0.460	1.89	1,123	31	34,813

I_H - Monthly average of daily radiation incident on horizontal surface.

K_T - Ratio of monthly averages of daily radiation on horizontal surface to the extra terrestrial radiation transmitted thru the atmosphere.

R - Ratio of monthly average daily radiation on a tilted surface to that on a horizontal surface based on Washington, D.C. latitude of 38° -51'N with collector tilt angle of latitude. Tilt angle = -15°. Interpolated from Table 14.

I_T - Monthly average of daily radiation incident normal to a tilted surface (I_H x R)

N - Number of days per month.

S - Monthly incident solar radiation on a tilted surface (I_T x N) for Washington, D.C.

TABLE 8

R VALUES FOR VARIOUS K_T RATIOS
BASED ON 38°-51' LATITUDE
COLLECTOR TILT ANGLE 24° (LATITUDE MINUS 15°)

Month	$K_T = 0.40$	$K_T = 0.50$	$K_T = 0.60$
January	1.43	1.51	1.57
February	1.28	1.33	1.37
March	1.14	1.18	1.20
April	1.04	1.05	1.06
May	0.97	0.97	0.98
June	0.94	0.94	0.94
July	0.96	0.96	0.95
August	1.01	1.02	1.02
September	1.09	1.12	1.14
October	1.23	1.28	1.31
November	1.38	1.45	1.52
December	1.48	1.57	1.64

The R values are for Washington, D.C.

TABLE 9

R VALUES FOR VARIOUS K_T RATIOS
BASED ON 38°-51' LATITUDE
COLLECTOR TILT ANGLE 29° (LATITUDE MINUS 10°)

Month	$K_T = 0.40$	$K_T = 0.50$	$K_T = 0.60$
January	1.49	1.59	1.67
February	1.32	1.38	1.44
March	1.14	1.19	1.22
April	1.03	1.04	1.05
May	0.95	0.95	0.96
June	0.92	0.92	0.91
July	0.94	0.94	0.93
August	1.00	1.01	1.01
September	1.09	1.12	1.14
October	1.26	1.30	1.35
November	1.45	1.53	1.61
December	1.56	1.67	1.76

The R values are for Washington, D.C.

TABLE 10

R VALUES FOR VARIOUS K_T RATIOS
BASED ON 38°-51' LATITUDE
COLLECTOR TILT ANGLE 34° (LATITUDE MINUS 5°)

Month	$K_T = 0.40$	$K_T = 0.50$	$K_T = 0.60$
January	1.55	1.66	1.75
February	1.35	1.42	1.49
March	1.15	1.19	1.24
April	1.01	1.03	1.04
May	0.93	0.93	0.93
June	0.89	0.89	0.88
July	0.91	0.91	0.90
August	0.98	0.99	0.99
September	1.09	1.12	1.15
October	1.28	1.59	1.38
November	1.50	1.59	1.67
December	1.62	1.75	1.85

The R values are for Washington, D.C.

TABLE 11

R VALUES FOR VARIOUS K_T RATIOS BASED ON 38°-51' LATITUDE COLLECTOR TILT ANGLE 39° (LATITUDE)

Month	K_T = 0.40	K_T = 0.50	K_T = 0.60
January	1.60	1.72	1.82
February	1.37	1.45	1.52
March	1.15	1.20	1.24
April	1.00	1.02	1.03
May	0.90	0.90	0.90
June	0.86	0.86	0.85
July	0.88	0.88	0.87
August	0.96	0.97	0.97
September	1.09	1.12	1.15
October	1.29	1.36	1.41
November	1.54	1.64	1.73
December	1.68	1.82	1.93

The R values are for Washington, D.C.

TABLE 12

R VALUES FOR VARIOUS K_T RATIOS
BASED ON 38°-51' LATITUDE
COLLECTOR TILT ANGLE 44° (LATITUDE PLUS 5°)

Month	$K_T = 0.40$	$K_T = 0.50$	$K_T = 0.60$
January	1.64	1.77	1.88
February	1.38	1.47	1.54
March	1.14	1.20	1.23
April	0.98	1.00	1.01
May	0.87	0.87	0.87
June	0.83	0.83	0.82
July	0.85	0.85	0.84
August	0.93	0.94	0.94
September	1.08	1.11	1.14
October	1.29	1.37	1.43
November	1.57	1.68	1.78
December	1.73	1.88	2.00

The R values are for Washington, D.C.

TABLE 13

R VALUES FOR VARIOUS K_T RATIOS
BASED ON 38°-51' LATITUDE
COLLECTOR TILT ANGLE 49° (LATITUDE PLUS 10°)

Month	$K_T = 0.40$	$K_T = 0.50$	$K_T = 0.60$
January	1.67	1.81	1.93
February	1.39	1.48	1.56
March	1.13	1.19	1.22
April	0.95	0.97	0.98
May	0.84	0.83	0.83
June	0.79	0.79	0.78
July	0.81	0.81	0.80
August	0.90	0.91	0.91
September	1.06	1.09	1.12
October	1.29	1.37	1.44
November	1.59	1.71	1.82
December	1.77	1.93	2.06

The R values are for Washington, D.C.

TABLE 14

R VALUES FOR VARIOUS K_T RATIOS
BASED ON 38°-51' LATITUDE
COLLECTOR TILT ANGLE 54° (LATITUDE PLUS 15°)

Month	$K_T = 0.40$	$K_T = 0.50$	$K_T = 0.60$
January	1.69	1.84	1.96
February	1.39	1.49	1.57
March	1.12	1.18	1.21
April	0.92	0.94	0.95
May	0.80	0.79	0.79
June	0.75	0.74	0.73
July	0.77	0.76	0.75
August	0.86	0.87	0.87
September	1.03	1.07	1.10
October	1.29	1.38	1.44
November	1.60	1.74	1.85
December	1.79	1.96	2.10

The R values are for Washington, D.C.

TABLE 15

Solar Beam Radiation Concentrating Solar Collector
Collector Tilt Angle - 39°

Month	I_T Btu/Day/ Sq. Ft.	Solar Declination 21st Day - Degrees	C	I_B Btu/Day/ Sq. Ft.	S_B Btu/Month Sq. Ft.
January	1,043	-19.9	0.058	961	29,791
February	1,290	-11.2	0.060	1,213	33,964
March	1,506	0	0.071	1,399	43,369
April	1,632	+11.9	0.097	1,476	44,280
May	1,662	+20.3	0.121	1,468	45,508
June	1,769	+23.45	0.134	1,541	46,230
July	1,698	+20.5	0.136	1,474	45,694
August	1,661	+12.1	0.122	1,460	45,260
September	1,634	+0	0.092	1,484	44,520
October	1,470	-10.7	0.073	1,364	42,284
November	1,222	-19.9	0.063	1,147	34,410
December	1,045	-23.45	0.057	987	30,597

I_T - Monthly average of daily radiation incident normal to tilted surface. See Table 4.

Solar Declination - 21st Day of Month - Obtained from ASHRAE Applications Handbook.

I_B - Beam radiation - Incident radiation - Diffused radiation - Ground reflectance.

Incident Radiation = $I_T \times C \times (1 + \cos \theta)/2$

C = Ratio of diffuse radiation to direct normal radiation. Obtained from ASHRAE Guide.

θ = The angle between the incoming solar and a line perpendicular to the collector surface. However, since concentrating collector tracks the sun, it is installed at latitude angle and θ is equal to solar declination.

Reflected Radiation = $I_T(1 - \cos \text{tilt angle})/2 \times 20\%$ (Ground reflectance)
= $0.022\ I_T$

S_B - Monthly incident solar beam component on tilted surface (I_B x Days/Month)

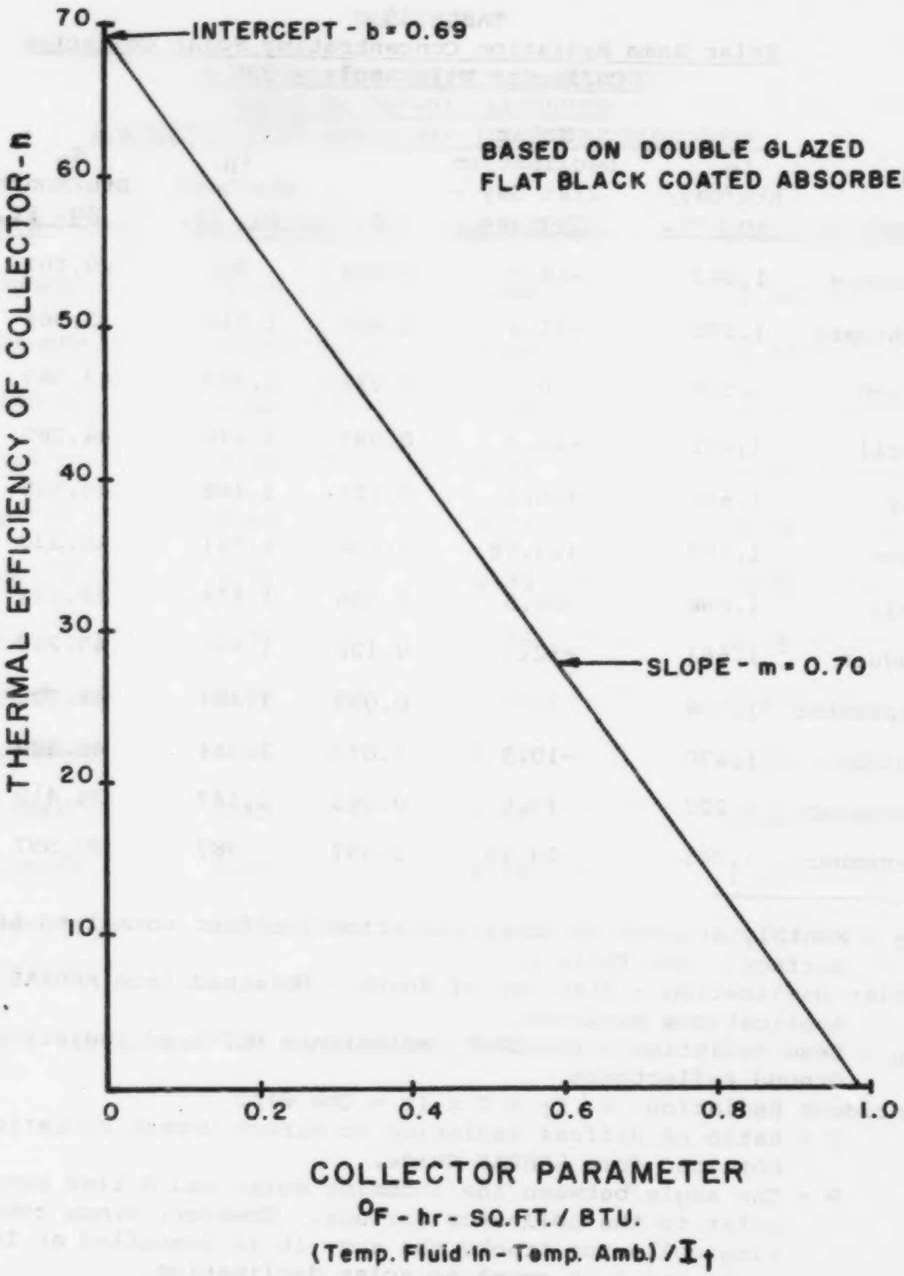
INTERCEPT - b = 0.69
BASED ON DOUBLE GLAZED
FLAT BLACK COATED ABSORBER
SLOPE - m = 0.70
THERMAL EFFICIENCY OF COLLECTOR - n
70
60
50
40
30
20
10
0
0.2
0.4
0.6
0.8
1.0
COLLECTOR PARAMETER
°F - hr - SQ.FT./ BTU.
(Temp. Fluid In - Temp. Amb.) / I_t

FIGURE 1

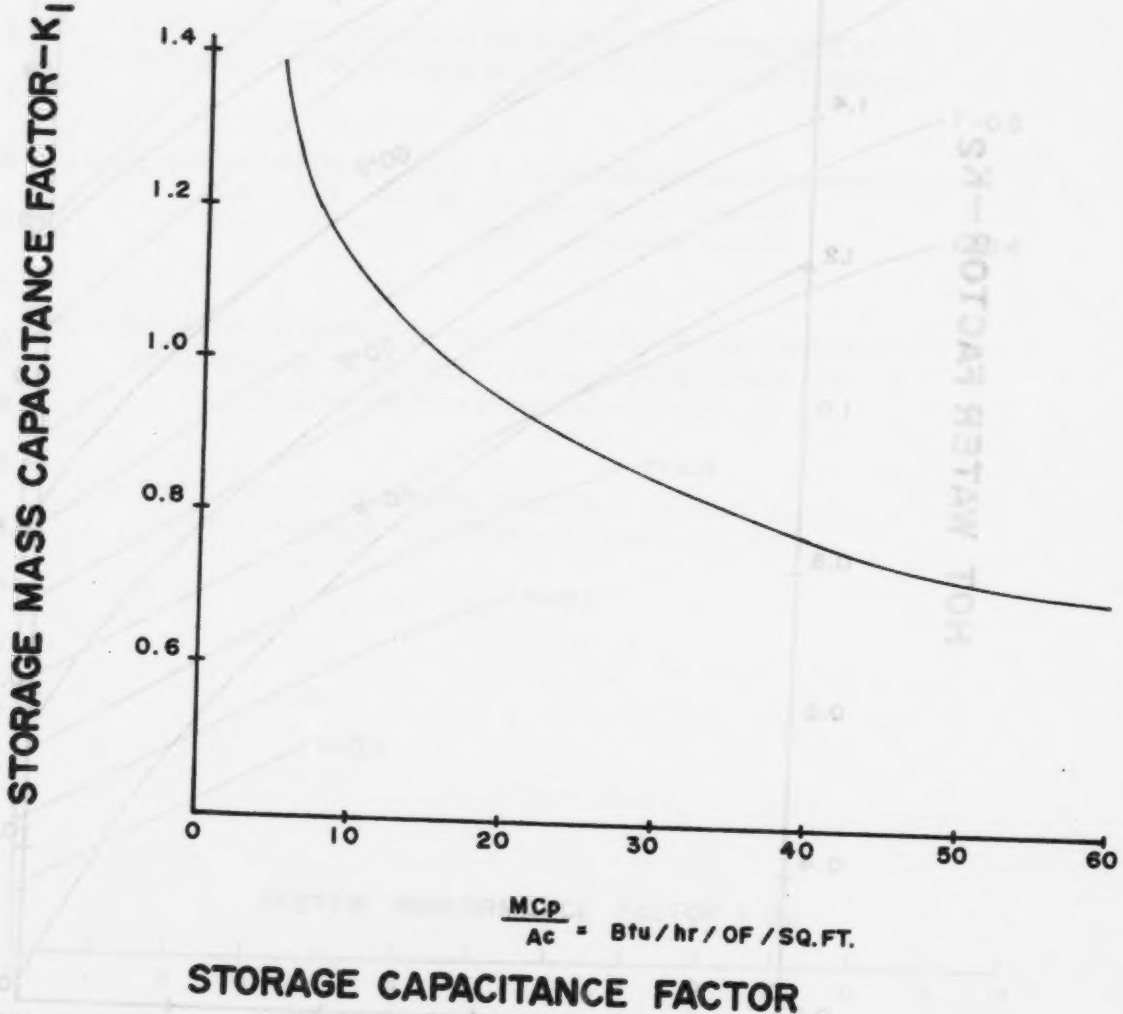
STORAGE MASS CAPACITANCE FACTOR-K_1
1.4
1.2
1.0
0.8
0.6
0
10
20
30
40
50
60
$\frac{MCp}{Ac}$ = Btu/hr/OF/SQ.FT.
STORAGE CAPACITANCE FACTOR

FIGURE 2

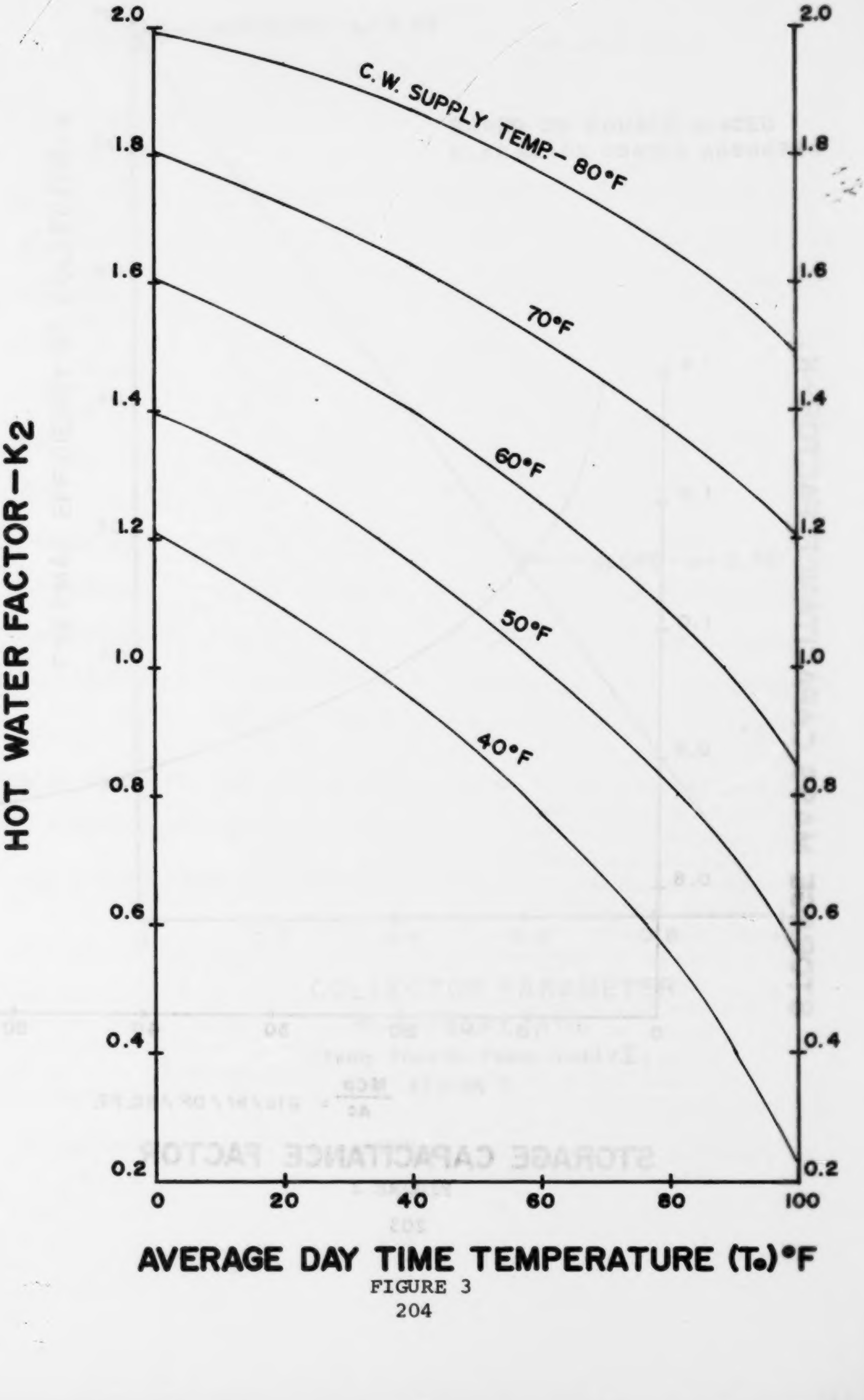
HOT WATER FACTOR-K2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
20
40
60
80
100
C.W. SUPPLY TEMP.- 80°F
70°F
60°F
50°F
40°F
AVERAGE DAY TIME TEMPERATURE (To)°F

FIGURE 3

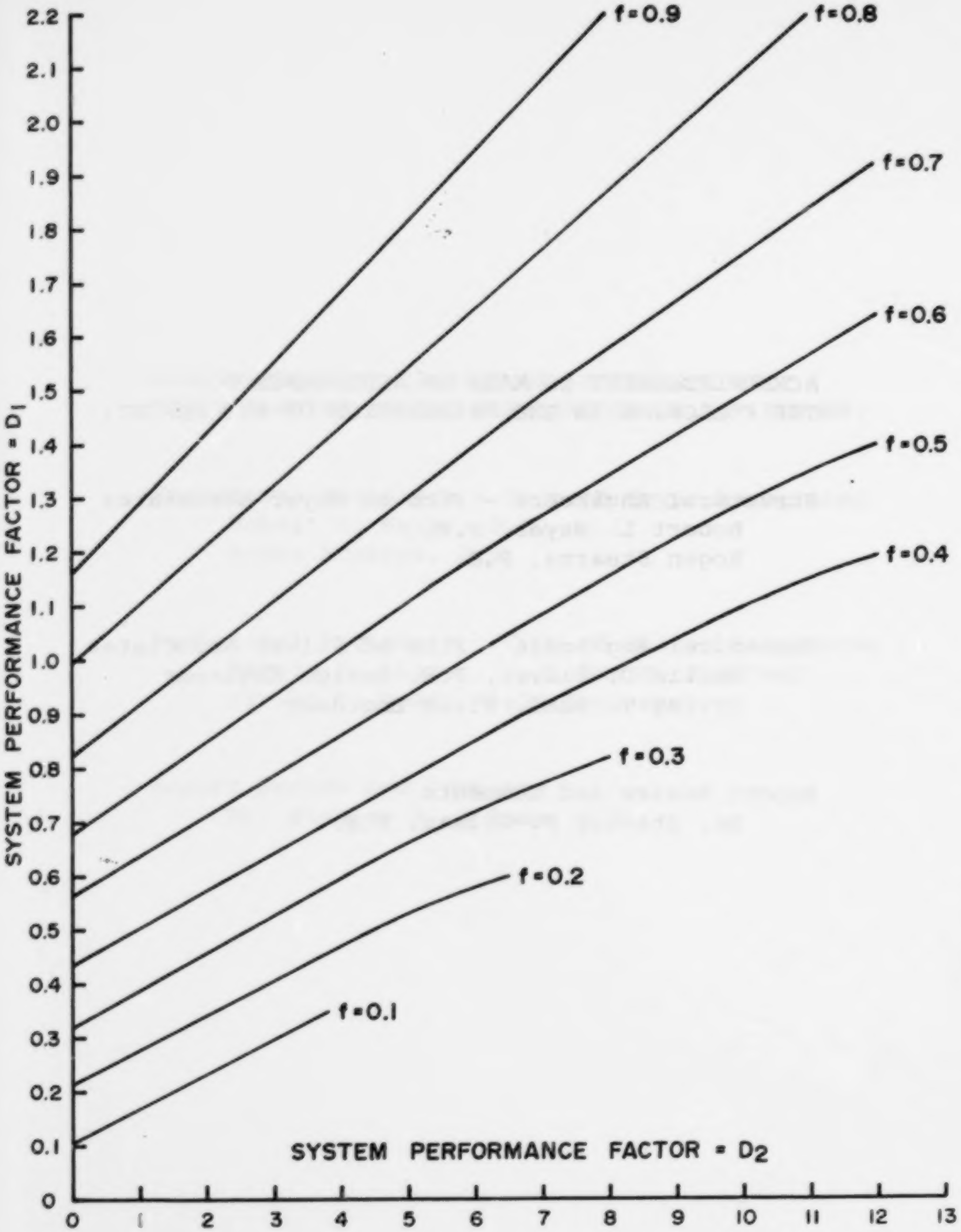

CHART FOR MONTHLY FRACTION OF TOTAL HEATING LOAD SUPPLIED BY SOLAR ENERGY

FIGURE 4

ACKNOWLEDGEMENT IS MADE OF ASSISTANCE OF
THE FOLLOWING IN THE PREPARATION OF THE REPORT:

Structural Engineers - Firm of Meyer Associates
    Robert L. Meyer, P.E.
    Rogan Stearns, P.E.

Mechanical Engineers - Firm of Silver Associates
    Martin D. Silver, P.E. Design Engineer
    Irving T. Read, Field Engineer

Report Review and Comments
    Dr. Stanley F. Gilman, P.E.

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Report Review and Comments
Dr. Stanley F. Gilman, P.E.

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95th Congress, 2d Session - - - - - - - - - - - - - - - - - House Document No. 95-366

MID-SESSION REVIEW OF THE 1979 BUDGET

COMMUNICATION

FROM

THE DIRECTOR, OFFICE OF MANAGEMENT AND BUDGET, EXECUTIVE OFFICE OF THE PRESIDENT

TRANSMITTING

A SUPPLEMENTAL SUMMARY OF THE BUDGET FOR FISCAL YEAR 1979, PURSUANT TO SECTION 201 OF THE BUDGET AND ACCOUNTING ACT OF 1921, AS AMENDED

JULY 10, 1978.—Referred to the Committee on Appropriations and ordered to be printed

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U.S. GOVERNMENT PRINTING OFFICE
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Executive Office of the President,
Office of Management and Budget,
Washington, D.C., July 6, 1978.

The Speaker of the House of Representatives.

Sir: Section 201 of the Budget and Accounting Act of 1921, as amended, requires that the President transmit to the Congress, on or before July 15 of each year, a supplemental summary of the budget for the ensuing fiscal year transmitted to the Congress by the President in January of that year. The supplemental summary of the 1979 budget contains:

Revised budget summaries and projections for fiscal years 1978–83;

Economic assumptions underlying the budget data;

A summary of estimated outlays in each of the first four years after fiscal year 1979 that will be required under continuing programs that have a legal commitment for future years or are considered mandatory under existing law; and

A summary of estimated outlays in future years from balances carried over from fiscal year 1979.

At the President's direction, I have the honor to transmit herewith the required supplemental summary of the fiscal year 1979 budget.

Respectfully,

James T. McIntyre, Jr.,
Director.

Enclosure.

Identical letter to the President of the Senate.

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EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

FOR RELEASE AT 3:00 P.M. (E.D.T.)
Thursday, July 6, 1978

MID-SESSION REVIEW OF THE 1979 BUDGET

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GENERAL NOTES

Budget figures for all years reflect a recent definitional change. Earned income credit payments in excess of an individual's tax liability, treated in the 1979 budget as income tax refunds, are now classified as outlays. This is in accordance with the treatment now used by both Houses of the Congress. The effect of the change is to increase budget authority, outlays, and receipts each by approximately $0.8 billion in all years, with no effect on deficit figures. The increase in budget authority and outlays shows up in the income security function and in the Department of the Treasury. In addition, administrative expenses and other activities (largely interest receipts) of the Exchange Stabilization Fund are now included in the budget. These are classified in the general government and international affairs functions, and in the Department of the Treasury. The data shown for the President's 1979 budget and the subsequent March revision have been adjusted accordingly so that they are comparable to the current estimates. For this reason, the figures shown in this document as budget and March estimates are not the same as published earlier.

All years referred to are fiscal years unless otherwise noted. Detail may not add to totals due to rounding.

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INTRODUCTION

This document provides:

- -- revised budget estimates for 1978 and the 1979-81 budget planning base (1978 and 1979 revisions are required by Section 201 of the Budget and Accounting Act, as amended);
- -- revised economic assumptions on which the new budget estimates are based;
- -- long-range projections for 1982 and 1983; and
- -- other supplementary information required by law.

By law, the budget revisions in this document are required by July 15.

Part 1

THE CURRENT BUDGET OUTLOOK, 1978-1981

Budget Totals

This review presents updated budget estimates for 1978 through 1981, and projections through 1983. The current estimates reflect:

-- policy changes enacted by the Congress or proposed by the President since the January budget;

-- reassessment of 1978 and 1979 outlays in light of actual spending patterns in recent months; and

-- technical changes in many estimates.

The current estimates supersede an initial set of revised budget estimates for 1978 and 1979 published in March. Table 1 compares the current estimates with the Administration's January and March figures.

The Administration's new estimate of the deficit in 1978 is $51 billion, and $48-1/2 billion in 1979. These figures have been reduced by over $10 billion as compared to the January estimates. The 1978 deficit reduction is almost entirely due to lower projected spending -- $452.3 billion, compared to a January estimate of $463.1 billion.

Table 1.--BUDGET TOTALS 1/
(in billions of dollars)

	Receipts	Outlays	Surplus or Deficit (-)
1977 Actual..................	357.8	402.8	-45.0
1978 Estimate:			
January.....................	401.3	463.1	-61.8
March.......................	401.4	454.4	-53.0
Current.....................	401.2	452.3	-51.1
1979 Estimate:			
January.....................	440.5	501.0	-60.5
March.......................	440.7	500.2	-59.5
Current.....................	448.2	496.6	-48.5
1980 Estimate 2/:			
January.....................	506.2	543.7	-37.5
Current.....................	507.3	549.4	-42.1
1981 Estimate 2/:			
January.....................	584.8	576.1	8.6
Current.....................	580.0	591.3	-11.3

NOTE: THE BUDGET DETAILS FOR 1980 AND 1981 DO NOT REFLECT BUDGET OR FISCAL POLICIES DESIRED BY THE ADMINISTRATION FOR THOSE YEARS. (SEE 2/ BELOW.)

1/ The 1977 actual data and the January and March estimates have been adjusted for accounting changes. See general note with the Table of Contents.

2/ These figures represent the planning numbers derived from policies proposed in January, adjusted for subsequent policy changes. They do not represent the numbers that will be published in the President's 1980 budget. The Administration regards the current estimates of 1980 outlays -- and the deficit that results -- as unacceptably high. The President's budget for 1980 will, therefore, reflect a fiscal program that will lead to substantially lower outlay levels. Reductions in 1980 spending will also reduce the current estimates of 1981 spending.

The decline in the 1979 deficit is partly due to decreased spending. A thorough review of planned outlays and actual spending experience has enabled the Administration to reduce spending estimates by $4-1/2 billioh below the January budget. In addition, as part of the President's anti-inflationary program, the Administration has decided to postpone the effective date of the proposed tax reduction package from October of 1978 to January of 1979, and to reduce the size of the tax cut from $25 billion to $20 billion annually. This action results in an increase in 1979 receipts of almost $11 billion. However, this increase is partly offset by other changes that bring total receipts to $448.2 billion.

The Administration believes that the deficit pattern, which is now projected at $51 billion for 1978 and $48-1/2 billion for 1979, represents a much more appropriate fiscal policy than did previous plans. The Administration also believes that the 1980 budget must provide for a substantial decline in the deficit below the amount shown in this review.

The outlays shown in this review for 1980 have increased above the January estimate, from $543.7 billion to $549.4 billion. Receipts have also increased slightly. Total outlays now estimated under the Administration's new multi-year budget planning and tracking system are unacceptably high for 1980. In developing the 1980 budget that the Administration will submit to the Congress next January, reductions substantially below the current planning base will be proposed.

The difficulties of this course of action should not be underestimated. A 1980 budget below the current planning base will be extremely constrained. However, the Administration believes that such constraint represents proper fiscal policy and is required if the deficit is to be substantially reduced below the 1979 level. Achieving this result will require close cooperation between the Congress and the Executive. It will also require a common recognition that the time has come for a "pause" in the rate of increase in the Federal budget. Major efforts will be undertaken by the Administration:

- -- to persuade the Congress to refrain from actions this year that will increase 1980 outlays;
- -- to identify ways of making Federal programs more efficient and of eliminating fraud, abuse, and waste;
- -- to develop proposals for restructuring high-priority programs in ways that will hold down their costs; and

-- to identify less-essential programs for reduction or elimination.

The 1979 outlay totals reported in this Mid-Session Review are $2.2 billion below the First Concurrent Resolution passed by the Congress. However, the President's current budget estimates contain $1.4 billion in outlays for energy rebates to offset proposed new energy taxes, which are not included in the Resolution. Excluding this item, which does not affect the deficit, the current Administration outlay total is $3.6 billion below the Resolution. Virtually all of this difference represents policy increases implicit in the Resolution.

Short-Range Economic Forecast

The economic outlook for calendar years 1978 and 1979 shows higher inflation, lower real growth, and less unemployment than was forecast in January.

The rate of inflation is now predicted to be about 7% during 1978 and about 6-1/2% during 1979. These figures are above the January budget assumptions by about a percentage point for 1978 and a half percentage point for 1979. Much of the worsening in the price outlook for 1978 results from larger food price increases than previously anticipated, and from the effect on domestic price levels of a decline in the

Table 2.--SHORT-RANGE ECONOMIC FORECAST
(calendar years; dollar amounts in billions)

	Actual 1977	Forecast 1978	Forecast 1979
Gross national product			
Current dollars:			
Amount	1,890	2,095	2,330
Percent change	10.7	10.9	11.2
Constant (1972) dollars):			
Amount	1,337	1,392	1,453
Percent change	4.9	4.1	4.3
Incomes (current dollars)			
Personal income	1,537	1,718	1,900
Wages and salaries	990	1,113	1,234
Corporate profits	172	181	201
Prices (percent change)			
GNP deflator:			
Year over year	5.5	6.5	6.6
Fourth quarter over fourth quarter	5.8	6.9	6.5
CPI:			
Year over year	6.5	6.8	6.4
December over December	6.8	7.2	6.5
Unemployment rates (percent)			
Total:			
Yearly average	7.0	6.0	5.7
Fourth quarter	6.6	5.9	5.6
Insured 1/	4.6	3.7	3.3
Federal pay raise, October (percent)	7.05	5.5	6.0
Interest rate, 91-day Treasury bills (percent) 2/	5.3	6.5	6.6

1/ Insured unemployment as a percentage of covered employment; includes unemployed workers receiving extended benefits.

2/ Average rate of new issues within period. The forecast assumes continuation of the market rates at the time for forecast was made.

value of the dollar abroad -- largely higher prices of imports. The price level forecasts for 1978 and 1979 emphasize the need to find ways to control inflation. If rates of inflation in the 6-7% range were to continue, the prospects for maintaining stable economic growth would be very slim.

The rate of real growth is less than was forecast in January by about a half percentage point in both 1978 and 1979. This lower growth is, in part, a result of the effects of higher inflation on consumer purchasing power and spending. It also reflects the fact that fiscal policy is less stimulative than was planned in the January budget. Despite the lower real growth, the expansion in employment and the decline in the unemployment rate are expected to equal or exceed earlier expectations. Demand for labor over the winter months was very strong. By March, the unemployment rate had already reached the level previously forecast for the fourth quarter of this year. The unemployment rate is now predicted to fall to 5.9% in the fourth quarter of this year and to 5.6% a year later. These figures are about a quarter of a percentage point below the January forecasts.

Budget Receipts

1978 and 1979.--Receipts in 1978 are now estimated at $401.2 billion, about the same as estimated in January. Receipts in 1979 are estimated to be $448.2 billion, almost $8 billion above the January budget estimate. Changes in legislation since January add almost $10 billion to 1979 receipts, while revised incomes and technical reestimates reduce receipts in 1979 by about $2 billion. With respect to legislation, the delay in the effective date of the Administration's tax reduction and reform proposals from October 1978 to January 1979, and the reduction in the size of the tax cut from an annual rate of $25 billion to $20 billion, increases 1979 receipts by $11 billion, and delayed enactment of the President's energy tax proposals reduces 1979 receipts by about $1 billion.

1980 and 1981.--Since January, estimated receipts have been revised upward by $1 billion for 1980 and revised downward by about $5 billion for 1981. As noted in Table 3, changes in legislation since January increase receipts by about $4 billion in 1980 and $2 billion in 1981. These legislative changes include the smaller tax cut, which increases estimated receipts by $5 billion in 1980 and $3 billion in 1981, and the urban initiative proposals announced in March, which reduce receipts by about $1 billion in each year. Revised incomes and technical reestimates reduce receipts by $3 billion in 1980 and by $7 billion in 1981.

Table 3.--CHANGE IN BUDGET RECEIPTS, 1978-1981
(in billions of dollars)

	1978	1979	1980	1981
January budget estimate 1/......	401.3	440.5	506.2	584.8
Changes in legislation:				
Delayed, smaller tax cut..	0.2	10.9	4.8	3.4
Delayed enactment of energy program...........	0.1	-0.9	0.1	0.1
Urban initiative..........	---	-0.2	-0.8	-1.3
Other.....................	-0.3	0.1	0.1	-0.1
Subtotal, Changes in legislation...........	*	9.8	4.1	2.1
Revised incomes and technical reestimates.......	-0.2	-2.1	-3.0	-6.9
Current estimate................	401.2	448.2	507.3	580.0

1/ Adjusted for accounting change relating to earned income credit payments in excess of an individual's tax liability. See general note with the Table of Contents.
* $50 million or less.

Budget Outlays

1978 and 1979.--Estimates of outlays for 1978 have been reduced by $11 billion since January. Revisions published in March reduced the estimates by nearly $9 billion. The current estimates are lower by an additional $2 billion. As shown in Table 4, this further reduction is the net effect of both increases and decreases.

The current estimates for 1979 reflect intensive Administration efforts further to constrain budget outlays. Revisions published in March reported a $1 billion decrease in outlays. The current estimates reduce total outlays for 1979 by $4-1/2 billion below the January estimates. Part 2 discusses the revisions for 1978 through 1981, function by function.

Examination of actual spending thus far this year indicates that most agencies have fallen below the spending plans consistent with their January estimates. The estimated shortfall since January that is reflected in this Mid-Session Review amounts to $10-1/2 billion in 1978 and $6-1/2 billion in 1979. It is clear that the tendency of agencies to overestimate spending for the current year -- which has caused shortfalls in all but one year since 1970 -- continues to be a problem. During the past year, OMB has worked with Federal agencies to improve the quality of their estimates. As compared to 1977, these estimates have improved, but the revisions incorporated in this review demonstrate that continued vigorous efforts must be made.

1980 and 1981.--In contrast to the reductions in outlay estimates for 1978 and 1979, outlays estimated for 1980 and

Table 4.--CHANGE IN BUDGET OUTLAYS, 1978 AND 1979
(in billions of dollars)

	1978	1979
January estimate 1/	463.1	501.0
Policy changes	-0.5	0.8
Reestimates:		
Department of Defense-Military	-1.5	---
Energy, natural resources, environment, and transportation	-2.0	0.2
Benefit payments for individuals:		
Unemployment benefits	-0.2	-0.4
Other	-1.5	---
Other:		
International financial programs	-0.9	-0.5
Net interest	-0.6	---
Offshore oil	-0.5	-0.5
Other	-1.0	-0.4
Subtotal, Reestimates	-8.2	-1.6
March 13 estimate 1/	454.4	500.2
Policy changes:		
Urban initiative	---	1.0
Farm bill	---	0.5
Other program changes (net)	0.2	1.2
Contingency allowance	---	-1.4
Subtotal, Policy changes	0.2	1.3
Reestimates:		
Department of Defense-Military	-1.8	-3.0
Energy, natural resources, environment, and transportation:		
TVA power marketing	0.2	0.6
Other	-1.5	-0.9
Benefit payments for individuals:		
Unemployment benefits	-0.4	-0.3
Other	-*	-0.7
Other:		
International financial programs	0.8	-0.1
Net interest	0.5	-0.1
Local public works	0.6	---
Farm price supports	-0.4	-0.5
Other	-0.3	0.1
Subtotal, Reestimates	-2.3	-4.9
Current estimate	452.3	496.6

1/ Adjusted for accounting changes. See general note with the Table of Contents.

* $50 million or less.

1981 have increased, on net, by $5-1/2 billion and $15 billion, respectively, since January. A large part of these increases results from changes in economic assumptions -- particularly the effects of higher assumed rates of inflation on cost-of-living adjustments for benefit programs, and the effects of higher assumed interest rates for payments on the public debt. New programs -- such as the urban initiative -- announced since January have also contributed to the increases. Reductions in some outlay figures now believed to have been overestimated in January -- such as those for defense -- partly offset the increases. The revisions are discussed, function by function, in Part 2.

The January budget announced that a multi-year budget planning system was being established. Thus, estimates for 1980 and 1981 are now being regularly monitored. As indicated above, the Administration regards the current estimates of 1980 outlays -- and the deficit that results -- as unacceptably high. This is particularly the case in view of current economic circumstances and prospective economic conditions, with inflation now running at rates that are also unacceptably high. The President's budget for 1980 will, therefore, reflect a fiscal program that will lead to substantially lower outlay levels. The anticipated 1980 budget will alter 1981 plans, but it is too early to reach a definitive judgment as to the proper 1981 fiscal policy.

Because of economic conditions, it may not be possible to balance the budget in that year. However, the President remains committed to balancing the budget as quickly as economic conditions permit.

Table 5.--CHANGE IN BUDGET OUTLAYS, 1980 AND 1981
(in billions of dollars)

	1980	1981
January budget estimate 1/	543.7	576.1
Major Administration initiatives:		
Urban initiative	2.8	3.9
Water resources	0.3	0.4
Higher education initiative	1.1	1.3
Subtotal, Major initiatives	4.3	5.6
Health and income security benefit payments:		
Retirement and disability	1.2	2.1
Medicare and medicaid	1.2	1.9
Public assistance and other income supplements	0.8	1.0
Unemployment compensation	-0.5	-*
Veterans compensation and pension legislation	0.6	0.6
Subtotal, Benefit payments	3.2	5.5
Net interest	2.3	3.9
Department of Defense-Military	-3.1	-2.5
Energy programs	0.6	1.5
EPA sewage construction grants	-0.6	---
Temporary employment assistance	-1.2	0.7
All other (net)	0.2	0.5
Current estimate	549.4	591.3

1/ Adjusted for accounting changes. See general note with the Table of Contents.
* $50 million or less.

Off-budget Federal entities.--Estimates of 1980 and 1981 outlays of off-budget Federal entities have changed since January primarily to reflect a revised assessment of the demand for loans financed by the Federal Financing Bank. Estimates of 1978 and 1979 off-budget outlays of the Postal Service have changed to reflect the adjustments in the recent postal rate change. For a discussion of off-budget Federal entities, see Part 6 of the *1979 Budget of the United States Government*.

Table 6.--OUTLAYS OF OFF-BUDGET FEDERAL ENTITIES, 1978-1981
(in billions of dollars)

	1978	1979	1980	1981
January budget estimate 1/......	11.6	12.6	8.2	7.8
Changes:				
Federal Financing Bank....	---	---	2.0	3.0
Postal Service............	-0.6	0.3	---	---
Other.....................	-*	-*	*	*
Current estimate................	11.0	12.9	10.2	10.8

1/ January figures adjusted to exclude the Exchange Stabilization Fund, for which on-budget treatment is proposed.

* $50 million or less.

Budget Authority

1978 and 1979.--The current estimate of total budget authority in 1978 is $503.8 billion, about the same as in

Table 7.--CHANGE IN BUDGET AUTHORITY, 1978 AND 1979
(in billions of dollars)

	1978	1979
January budget estimate 1/	503.9	569.1
Policy changes:		
Higher education initiative	---	1.2
Other program changes (net)	-0.4	1.1
Contingency allowance	---	-1.3
Subtotal, Policy changes	-0.4	1.0
Reestimates:		
Municipal bond option	---	-1.8
Other	-1.7	-1.8
Subtotal, Reestimates	-1.7	-3.5
March estimate 1/	501.7	566.6
Policy changes:		
Urban initiative	---	5.9
Water resources initiative	---	0.8
Veterans pension reform	---	0.5
Energy rebates (delay in enactment)	-0.3	-0.5
ConRail	---	0.4
Federal pay cap	---	-0.3
Other program changes	0.6	1.1
Contingency allowance	---	-1.7
Subtotal, Policy changes	0.3	6.1
Reestimates:		
Disaster relief	0.9	---
Military sales trust fund	0.8	-0.2
Social security and medicare trust funds	0.3	1.0
Unemployment trust fund and receipts	-0.8	-1.9
Net interest	0.5	-0.1
Other	0.1	*
Subtotal, Reestimates	1.8	-1.2
Current estimate	503.8	571.4

1/ Adjusted for accounting changes. See general note with the Table of Contents.

* $50 million or less.

January, and $2.1 billion above the March estimate. Most of the change since March is due to the increased authority required for disaster relief and loans, and reestimates of trust funds receipts and interest.

The current estimate of budget authority in 1979 is $571.4 billion, $2.4 billion above the January estimate and $4.9 billion above the March estimate. Increases in budget authority for the urban initiative, water resources, and other programs are partly offset by the elimination of the allowance for contingencies and revisions in the estimates for several trust fund receipts.

1980 and 1981.--The current totals for budget authority in 1980 and 1981 are $12-1/2 and $16 billion above the corresponding January totals. The urban initiative accounts for more than $7 billion of this increase in both years. The current estimates also include several other initiatives announced since January, plus substantial upward reestimates for interest costs. The changes in the estimates for training and employment reflect the Administration's proposals for countercyclical public jobs, submitted after the January budget was issued, and revised estimates of unemployment and the costs of welfare reform. Budget authority and outlays for the countercyclical jobs proposal are linked to the unemployment rate, with $1 billion provided for each full half percentage point by which the unemployment rate is over 4.75%. Thus, if the actual unemployment rate differs significantly from the projected rate, budget authority and outlays will also differ.

Table 8.--CHANGE IN BUDGET AUTHORITY, 1980 AND 1981
(in billions of dollars)

	1980	1981
January budget estimate 1/	612.6	664.4
Changes:		
Urban initiative	7.1	7.5
Higher education initiative	1.3	1.4
Water resources initiative	0.8	0.8
Veterans compensation and pension legislation	0.6	0.6
Municipal bond option reestimate	*	-1.3
Net interest (reestimate)	2.3	3.9
Retirement and disability programs	1.0	-0.9
Export-Import Bank (reestimate)	-1.3	-0.3
Pay and contingencies allowances	2.1	1.3
Training and employment programs	-2.4	0.9
Department of Defense-Military	*	0.8
Energy programs	0.3	0.5
Other (net)	0.8	1.0
Current estimate	625.2	680.6

1/ Adjusted for accounting changes. See general note with the Table of Contents.

* $50 million or less.

Table 9.--BUDGET RECEIPTS BY MAJOR SOURCE, 1977-1979 1/
(in billions of dollars)

	1977	1978 Estimate			1979 Estimate		
	Actual	January	Current	Change	January	Current	Change
Individual income taxes.............	157.6	179.8	182.0	2.3	191.0	200.1	9.1
Corporation income taxes............	54.9	58.9	59.0	*	62.5	60.8	-1.6
Social insurance taxes and contributions......................	108.7	124.1	123.6	-0.5	141.9	142.3	0.4
Excise taxes........................	17.5	20.2	18.2	-1.9	25.5	24.6	-0.9
Estate and gift taxes...............	7.3	5.6	5.2	-0.4	6.1	5.7	-0.4
Customs duties......................	5.2	5.8	6.1	0.3	6.4	6.7	0.3
Miscellaneous receipts..............	6.5	6.9	7.1	0.2	7.2	8.0	0.8
Total budget receipts.......	357.8	401.3	401.2	-0.1	440.5	448.2	7.7

1/ The 1977 actual data and the January estimates for 1978 and 1979 have been adjusted to reflect an accounting change relating to earned income credit payments in excess of an individual's tax liability. See general note with the Table of Contents.

* $50 million or less.

Table 10.--BUDGET OUTLAYS BY FUNCTION, 1977-1979 1/
(in billions of dollars)

	1977	1978 Estimate			1979 Estimate		
	Actual	Budget	Current	Change	Budget	Current	Change
National defense 2/	97.5	107.6	104.2	-3.4	117.8	114.6	-3.2
International affairs	4.8	6.6	6.5	-0.1	7.6	7.4	-0.2
General science, space and technology	4.7	4.8	4.8	-*	5.1	5.1	*
Energy	4.2	7.8	6.3	-1.5	9.6	10.4	0.8
Natural resources and environment	10.0	12.1	11.5	-0.6	12.2	11.8	-0.5
Agriculture	5.5	9.1	8.7	-0.4	5.4	5.6	0.1
Commerce and housing credit	-*	3.5	3.4	-0.2	3.0	3.0	*
Transportation	14.6	16.3	15.4	-0.9	17.4	17.3	-0.1
Community and regional development	6.3	9.7	10.5	0.8	8.7	9.4	0.7
Education, training, employment, and social services	21.0	27.5	26.6	-0.9	30.4	31.4	1.0
Health	38.8	44.3	43.8	-0.5	49.7	49.8	0.1
Income security	137.9	148.6	146.9	-1.7	160.9	159.6	-1.3
Veterans benefits and services	18.0	18.9	18.8	-0.1	19.3	19.8	0.5
Administration of justice	3.6	4.0	4.0	-0.1	4.2	4.4	0.2
General government	3.4	4.1	3.8	-0.3	4.3	4.2	-0.1
General purpose fiscal assistance	9.5	9.9	9.6	-0.3	9.6	9.5	-0.1
Interest	38.1	43.8	43.8	-0.1	49.0	49.0	*
Allowances 3/	---	---	---	---	2.8	1.1	-1.7
Undistributed offsetting receipts:							
Employer share, employee retirement	-4.5	-5.0	-5.0	*	-5.2	-5.1	*
Interest received by trust funds	-8.1	-8.6	-8.6	-*	-9.1	-9.2	-0.1
Rents and royalties on the Outer Continental Shelf	-2.4	-2.0	-2.4	-0.4	-1.8	-2.3	-0.5
Total budget outlays	402.8	463.1	452.3	-10.8	501.0	496.6	-4.4

1/ The 1977 actual data and the January estimates for 1978 and 1979 have been adjusted for accounting changes. See general note with the Table of Contents.

2/ Includes allowances for civilian and military pay raises for the Department of Defense.

3/ Includes allowances for civilian agency pay raises and contingencies.

* $50 million or less.

Table 11.--BUDGET OUTLAYS BY AGENCY, 1977-1979 1/
(in billions of dollars)

	1977	1978 Estimate			1979 Estimate		
	Actual	Budget	Current	Change	Budget	Current	Change
Legislative branch	1.0	1.1	1.0	-*	1.2	1.2	*
The Judiciary	0.4	0.5	0.5	*	0.5	0.5	*
Executive Office of the President	0.1	0.1	0.1	*	0.1	0.1	*
Funds appropriated to the President	2.5	4.9	5.2	0.3	5.1	5.4	0.3
Agriculture	16.7	22.6	21.6	-1.0	17.7	18.0	0.2
Commerce	2.6	4.5	5.2	0.6	4.4	4.6	0.2
Defense-Military 2/	95.7	105.3	102.0	-3.3	115.2	112.0	-3.2
Defense-Civil	2.3	2.5	2.5	-*	2.5	2.6	*
Energy	5.2	8.2	6.6	-1.5	10.1	10.2	0.2
Health, Education, and Welfare	147.5	164.6	163.3	-1.3	181.3	181.3	0.1
Housing and Urban Development	5.8	8.4	8.0	-0.4	9.5	9.4	-0.1
Interior	3.2	3.9	3.9	*	4.0	4.0	*
Justice	2.4	2.5	2.5	-0.1	2.5	2.7	0.2
Labor	22.4	23.7	22.9	-0.8	25.1	24.7	-0.4
State	1.1	1.2	1.3	*	1.4	1.4	0.1
Transportation	12.5	14.4	13.5	-0.9	15.8	15.4	-0.4
Treasury	50.5	57.6	56.3	-1.3	63.4	63.4	-*
Environmental Protection Agency	4.4	5.1	4.5	-0.5	5.7	5.0	-0.7
General Services Administration	-*	0.3	0.1	-0.2	0.3	0.2	-0.1
National Aeronautics and Space Administration	3.9	4.0	4.0	-*	4.3	4.3	*
Veterans Administration	18.0	18.9	18.8	-0.1	19.2	19.8	0.5
Other independent agencies	19.9	24.5	24.6	0.2	24.9	26.0	1.1
Allowances 3/	---	---	---	---	2.8	1.1	-1.7
Undistributed offsetting receipts	-15.1	-15.6	-16.1	-0.5	-16.0	-16.6	-0.6
Total budget outlays	402.8	463.1	452.3	-10.8	501.0	496.6	-4.4

1/ The 1977 actual data and the January estimates for 1978 and 1979 have been adjusted for accounting changes. See general note with the Table of Contents.

2/ Includes allowances for civilian and military pay raises for the Department of Defense.

3/ Includes allowances for civilian agency pay raises and contingencies.

* $50 million or less.

Table 12.--BUDGET AUTHORITY BY FUNCTION, 1977-1979 1/
(in billions of dollars)

	1977	1978 Estimate			1979 Estimate		
	Actual	Budget	Current	Change	Budget	Current	Change
National defense 2/....................	110.4	117.8	118.0	0.2	128.4	128.3	-0.1
International affairs..................	6.6	11.1	11.9	0.8	13.8	13.1	-0.7
General science, space and technology.	4.6	4.9	4.9	-*	5.2	5.2	-*
Energy.................................	5.0	8.5	8.1	-0.5	9.5	9.5	-0.1
Natural resources and environment.....	9.5	12.9	13.1	0.2	12.7	13.6	1.0
Agriculture............................	2.4	3.8	3.9	0.1	7.2	7.2	-*
Commerce and housing credit...........	5.5	5.4	5.4	*	6.6	6.7	0.1
Transportation.........................	10.4	15.1	15.2	*	18.6	19.3	0.7
Community and regional development....	12.8	8.7	9.7	1.0	7.7	12.7	5.0
Education, training, employment, and social services.....................	30.4	22.8	22.3	-0.5	33.6	35.6	2.0
Health.................................	40.4	46.5	46.7	0.2	52.6	52.7	0.1
Income security........................	169.5	181.3	180.3	-1.0	191.8	191.1	-0.7
Veterans benefits and services........	19.1	19.1	19.1	---	19.1	19.7	0.6
Administration of justice.............	3.6	3.9	3.9	*	4.1	4.3	0.2
General government.....................	3.9	4.1	4.0	-0.1	4.4	4.3	-*
General purpose fiscal assistance.....	9.3	9.7	9.7	*	16.6	14.6	-2.0
Interest...............................	38.1	43.8	43.8	-0.1	49.0	49.0	*
Allowances 3/..........................	---	---	---	---	4.2	1.1	-3.1
Undistributed offsetting receipts:							
Employer share, employee retirement	-4.5	-5.0	-5.0	*	-5.2	-5.1	*
Interest received by trust funds...	-8.1	-8.6	-8.6	-*	-9.1	-9.2	-0.1
Rents and royalties on the Outer Continental Shelf..........	-2.4	-2.0	-2.4	-0.4	-1.8	-2.3	-0.5
Total budget authority........	466.1	503.9	503.8	-0.1	569.1	571.4	2.4

1/ The 1977 actual data and the January estimates for 1978 and 1979 have been adjusted for accounting changes. See general note with the Table of Contents.

2/ Includes allowances for civilian and military pay raises for the Department of Defense.

3/ Includes allowances for civilian agency pay raises and contingencies.

* $50 million or less.

Table 13.--BUDGET AUTHORITY BY AGENCY, 1977-1979 1/
(in billions of dollars)

	1977	1978 Estimate			1979 Estimate		
	Actual	Budget	Current	Change	Budget	Current	Change
Legislative branch	1.0	1.1	1.1	*	1.2	1.2	*
The Judiciary	0.4	0.5	0.5	*	0.5	0.5	*
Executive Office of the President	0.1	0.1	0.1	*	0.1	0.1	*
Funds appropriated to the President	4.6	9.0	9.9	0.9	11.0	10.9	-0.1
Agriculture	15.5	17.2	17.3	0.1	20.0	20.1	0.1
Commerce	8.2	2.4	2.4	*	2.7	4.1	1.4
Defense-Military 2/	108.4	115.3	115.5	0.2	125.6	125.5	-0.1
Defense-Civil	2.5	2.7	2.7	---	2.5	3.0	0.5
Energy	6.6	10.6	10.3	-0.3	11.6	11.6	-0.1
Health, Education, and Welfare	147.6	162.3	162.4	0.1	185.0	187.3	2.3
Housing and Urban Development	33.9	38.1	38.1	---	33.1	33.8	0.6
Interior	3.7	4.3	4.5	0.3	4.5	4.7	0.3
Justice	2.3	2.4	2.4	*	2.5	2.6	0.2
Labor	31.2	20.7	20.0	-0.7	29.9	28.6	-1.2
State	1.2	1.4	1.5	*	1.5	1.5	0.1
Transportation	9.3	13.6	13.6	*	17.4	17.6	0.3
Treasury	50.3	57.5	56.5	-1.0	70.5	68.6	-1.9
Environmental Protection Agency	2.8	5.5	5.5	---	5.6	5.7	*
General Services Administration	0.3	0.2	0.2	-*	0.3	0.3	*
National Aeronautics and Space Administration	3.8	4.1	4.1	-*	4.4	4.4	-*
Veterans Administration	19.0	19.0	19.0	---	19.0	19.7	0.6
Other independent agencies	28.3	31.6	32.4	0.8	32.2	35.2	3.0
Allowances 3/	---	---	---	---	4.2	1.1	-3.1
Undistributed offsetting receipts	-15.1	-15.6	-16.1	-0.5	-16.0	-16.6	-0.6
Total budget authority	466.1	503.9	503.8	-0.1	569.1	571.4	2.4

1/ The 1977 actual data and the January estimates for 1978 and 1979 have been adjusted for accounting changes. See general note with the Table of Contents.

2/ Includes allowances for civilian and military pay raises for the Department of Defense.

3/ Includes allowances for civilian agency pay raises and contingencies.

* $50 million or less.

Table 14.--BUDGET SURPLUS OR DEFICIT (-) BY FUND GROUP AND TYPE OF TRANSACTION, 1977-1979 1/

(in billions of dollars)

	1977	1978 Estimate		1979 Estimate	
	Actual	January	Current	January	Current
Federal Funds					
Transactions with the public..........	-25.2	-43.3	-33.5	-44.1	-33.5
Transactions with trust funds.........	-29.3	-28.8	-29.4	-30.4	-29.6
Total............................	-54.5	-72.1	-62.9	-74.4	-63.1
Trust Funds					
Transactions with the public..........	-19.8	-18.5	-17.6	-16.5	-15.0
Transactions with Federal funds.......	29.3	28.8	29.4	30.4	29.6
Total............................	9.5	10.3	11.8	13.9	14.6
Budget Totals					
Federal funds........................	-54.5	-72.1	-62.9	-74.4	-63.1
Trust funds..........................	9.5	10.3	11.8	13.9	14.6
Total............................	-45.0	-61.8	-51.1	-60.5	-48.5

1/ The 1977 actual data and the January estimates for 1978 and 1979 have been adjusted for accounting changes. See general note with the Table of Contents.

Table 15.--BUDGET RECEIPTS AND OUTLAYS BY FUND GROUP, 1977-1979 1/

(in billions of dollars)

	1977	1978 Estimate		1979 Estimate	
	Actual	January	Current	January	Current
Receipts					
Federal funds	241.3	268.8	269.4	290.0	298.3
Trust funds	152.8	168.5	168.4	188.0	188.6
Intragovernmental transactions	-36.3	-36.0	-36.6	-37.5	-38.8
Total	357.8	401.3	401.2	440.5	448.2
	=====	=====	=====	=====	=====
Outlays					
Federal funds	295.9	340.9	332.2	364.4	361.4
Trust funds	143.3	158.2	156.7	174.1	174.0
Intragovernmental transactions	-36.3	-36.0	-36.6	-37.5	-38.8
Total	402.8	463.1	452.3	501.0	496.6
	=====	=====	=====	=====	=====
Surplus or Deficit (-)					
Federal funds	-54.5	-72.1	-62.9	-74.4	-63.1
Trust funds	9.5	10.3	11.8	13.9	14.6
Total	-45.0	-61.8	-51.1	-60.5	-48.5
	=====	=====	=====	=====	=====

1/ The 1977 actual data and the January estimates for 1978 and 1979 have been adjusted for accounting changes. See general note with the Table of Contents.

Table 16.--DEBT SUBJECT TO LIMIT, 1977-1979 1/
(in billions of dollars)

	1977	1978 Estimate		1979 Estimate	
	Actual	January	Current	January	Current
Unified budget deficit	45.0	61.8	51.1	60.5	48.5
Portion of budget deficit attributable to trust funds surplus or deficit (-)	9.5	10.3	11.8	13.9	14.6
Federal funds deficit	54.5	72.1	62.9	74.4	63.1
Deficit of off-budget Federal entities	8.7	11.6	11.0	12.6	12.9
Total to be financed	63.2	83.7	73.9	87.0	76.0
Means of financing other than borrowing, and other adjustments	0.9	-5.7	-5.5	2.6	3.5
Change in debt subject to limit	64.1	78.0	68.4	89.6	79.5
Debt subject to limit, beginning of year 2/	635.8	700.0	700.0	777.9	768.3
Anticipated debt subject to limit, end of year 2/	700.0	777.9	768.3	867.5	847.8

1/ The 1977 actual data and the January estimates for 1978 and 1979 have been adjusted for comparability to reflect proposed legislation to place Treasury's Exchange Stabilization Fund on-budget. See general note with the Table of Contents.

2/ The statutory debt limit is permanently established at $400 billion. Public Law 95-252 temporarily increased the statutory debt limit to $752 billion through July 31, 1978.

Part 2

CHANGES IN BUDGET AUTHORITY AND OUTLAYS BY NATIONAL NEEDS CATEGORY OR FUNCTION

050: NATIONAL DEFENSE

	($ billions)			
	1978	1979	1980	1981
Budget Authority				
January budget estimate.........	117.8	128.4	139.6	150.9
Changes:				
DOD-Military:				
Military retired pay...	---	0.1	0.1	0.2
Pay raise cap & revised pay assumptions.......	---	-0.2	-0.4	-0.4
Currency revaluation...	0.2	---	---	---
Purchases inflation....	---	---	0.3	1.0
Subtotal, DOD.....	0.2	-0.1	*	0.8
Other.....................	-*	-0.1	0.1	0.1
Current estimate................	118.0	128.3	139.7	151.8
Outlays				
January budget estimate.........	107.6	117.8	128.6	139.3
Changes:				
DOD-Military:				
Military retired pay...	---	0.1	0.1	0.2
Pay raise cap & revised pay assumptions.......	---	-0.2	-0.4	-0.4
Currency revaluation...	0.1	*	*	*
Purchases inflation....	---	---	0.2	0.9
Reestimates of spendout rates:				
Procurement.........	-2.2	-2.0	-2.0	-2.0
Other...............	-1.2	-1.1	-1.1	-1.2
Subtotal, DOD.....	-3.3	-3.2	-3.1	-2.5
Other.....................	-0.1	-*	*	0.1
Current estimate................	104.2	114.6	125.5	136.9

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* $50 million or less.

Budget authority for Department of Defense-Military functions has been revised downward since January to reflect a lower 1979 pay raise proposed by the Administration. This is offset in 1980 and 1981 by the effect of higher rates of inflation on the cost of goods and services purchased.

Outlays for pay and purchases are similarly affected by the revised pay raise and inflation assumptions. In addition, estimates of outlays for purchases have been revised downward by more than $3 billion a year for 1978-81 to reflect the lower spendout rates experienced in recent years. These declining rates are the result of increasing lags between the time funds are appropriated to the Department, and the time that the eventual outlay of those funds takes place.

150: INTERNATIONAL AFFAIRS

	($ billions) 1978	1979	1980	1981
Budget Authority				
January budget estimate	11.1	13.8	14.4	14.3
Changes:				
Foreign aid:				
Military assistance	-*	*	*	-0.2
Security supporting assistance	---	*	---	---
Other	*	*	*	-*
Export-Import Bank	---	-0.7	-1.3	-0.3
Military sales trust fund	0.8	-0.2	-0.2	-0.3
Other	*	0.1	*	*
Current estimate	11.9	13.1	13.0	13.4
Outlays				
January budget estimate 1/	6.7	7.6	8.4	9.5
Changes:				
Foreign aid:				
Military assistance	-*	*	0.1	-0.2
Security supporting assistance	---	0.3	*	---
Other	-0.1	*	0.1	-0.1
Export-Import Bank	-0.5	-0.4	-0.2	-0.1
Military sales trust fund	0.5	-0.2	-0.2	-0.3
Other	*	0.1	*	*
Current estimate	6.5	7.4	8.3	8.8

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* $50 million or less.

1/ January outlay estimates revised to include the outlays (except administrative expenses) of the Exchange Stabilization Fund ($-0.1 billion per year), proposed for on-budget status.

Most of the changes in the budget authority and outlay totals for this function since January are due to reestimates rather than policy changes. Budget authority estimates for the Export-Import Bank have been reduced for 1979 through 1981 to reflect lower usage of guarantees and insurance than previously anticipated. Estimates of outlays for the Bank have been reduced in all years due to the much slower than anticipated disbursement rates for direct loans. The changes in the military trust fund reflect revised estimates of receipts, which are an offset to both budget authority and outlays. Outlays for security supporting assistance reflect a $250 million increase in 1979 due to acceleration of disbursements for Israel.

250: GENERAL SCIENCE, SPACE, AND TECHNOLOGY

	($ billions)			
	1978	1979	1980	1981
Budget Authority				
January budget estimate.........	4.9	5.2	5.4	5.1
Changes:				
Space......................	-*	-*	*	0.1
Science....................	---	---	---	---
Current estimate................	4.9	5.2	5.4	5.2
Outlays				
January budget estimate.........	4.8	5.1	5.3	5.2
Changes:				
Space......................	-*	-*	*	0.1
Science....................	---	---	---	---
Current estimate................	4.8	5.1	5.3	5.2

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* $50 million or less.

There have been no changes in the estimates for science, and only minor changes in the estimates for space and technology.

270: ENERGY

	($ billions)			
	1978	1979	1980	1981
Budget Authority				
January budget estimate.........	8.5	9.5	6.6	6.0
Changes:				
Strategic petroleum reserve..................	-0.4	---	0.4	0.1
Naval petroleum reserves receipts.................	*	-*	-0.3	0.1
Automobile fuel-efficiency tax rebates.............	-0.2	-*	---	---
Other....................	0.1	*	0.2	0.3
Current estimate................	8.1	9.5	6.9	6.5
Outlays				
January budget estimate.........	7.8	9.6	10.4	7.0
Changes:				
Strategic petroleum reserve..................	-1.2	0.1	0.4	0.9
Naval petroleum reserves receipts.................	*	-*	-0.3	0.1
TVA......................	0.2	0.6	-*	-*
Automobile fuel-efficiency tax rebates.............	-0.2	-*	---	---
Other....................	-0.4	0.2	0.5	0.5
Current estimate................	6.3	10.4	11.0	8.5

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* $50 million or less.

In comparison to the January budget, the current estimates of outlays for the energy function are substantially lower in 1978 and higher in the subsequent years. These changes are largely due to reestimates in the following programs:

- Strategic petroleum reserve.--Delays in filling the reserve have resulted in substantial reductions in estimated budget authority and outlays in 1978. However, the Administration remains committed to completing storage of 500 million barrels by December 1980, and to developing a 1-billion-barrel reserve by 1985. Consequently, planned budget authority and outlays remain approximately the same in 1979 and increase in 1980 and 1981.
- Naval petroleum reserves receipts.--Estimated receipts from oil production at the naval petroleum reserves have been reduced in 1978, increased in 1979 and 1980, and reduced in 1981.
- Tennessee Valley Authority (TVA).--Outlay estimates for ongoing construction projects have been increased in both 1978 and 1979, because of higher costs and faster than expected progress.

Other changes are due to delays in congressional action on the President's energy proposals, mostly reflected in reduced rebates from the automobile fuel-efficiency tax. Also, estimates of uranium enrichment production have decreased in 1978, resulting in reduced outlays. However, reduced revenues from the sale of enriched uranium are anticipated in succeeding years, raising outlays and budget authority. On the other hand, budget authority in 1979 and the later years is decreased slightly as a result of the decision to stretch out the construction schedule for the planned gas-centrifuge uranium enrichment facility. Finally, increased funding for 1979 and later years is proposed for the energy supply initiatives recently announced by the President.

300: NATURAL RESOURCES AND ENVIRONMENT

	($ billions)			
	1978	1979	1980	1981
Budget Authority				
January budget estimate.........	12.9	12.7	12.8	12.6
Changes:				
Water resources...........	---	0.8	0.9	1.0
Recreational resources....	0.2	0.2	0.2	0.2
Other.....................	-*	0.1	*	*
Current estimate................	13.1	13.6	13.9	13.7
Outlays				
January budget estimate.........	12.1	12.2	13.1	13.2
Changes:				
Water resources...........	-0.2	0.2	0.4	0.6
Recreational resources....	0.2	-*	0.1	0.1
Conservation and land management...............	-0.1	0.1	-0.1	-*
EPA sewage plant construction grants......	-0.5	-0.8	-0.6	---
Other.....................	*	*	-*	-*
Current estimate................	11.5	11.8	12.9	13.9

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* $50 million or less.

The current estimates of budget authority for this function are above the January budget, largely because the Administration has proposed new starts for water resources projects and a program of urban parks rehabilitation. The latter is part of the urban initiative, discussed more fully under community and regional development. Total outlays for the function have been reduced for all years except 1981 to reflect recent spending trends for Environmental Protection Agency sewage plant construction grants and other programs.

On June 6, 1978, the President proposed water policy initiatives designed to improve planning and management of Federal water resource programs, to provide increased emphasis on water conservation, to enhance Federal-State cooperation, and to increase attention to environmental quality. In conjunction with the new water policy initiatives, the President proposed about 60 new water project construction and planning starts. Funding for these projects -- as well as future projects to be proposed in later years -- is reflected in the increased budget authority and outlays for water resources shown in 1979-1981. The current estimates for 1980 and 1981 also reflect upward revisions in the costs of building and of operating existing projects.

The current 1978 budget authority and outlays for recreational resources are $0.2 billion above January due to recent passage of the Redwood Parks Expansion Bill. Most of the changes in budget authority and outlays for recreational resources in 1979-1981 reflect the urban parks component of the President's urban initiative.

Estimated outlays for several programs -- including water resources and conservation and land management -- are reduced in 1978. The largest reduction is in the sewage plant construction grant program of the Environmental Protection Agency, where short-term delays in outlays reduce estimates not only in 1978, but also in 1979 and 1980. The outlay reductions result from delays experienced by grantees in constructing approved projects. As the problems causing these delays are resolved, outlays are expected to resume the trend projected in January for the period after 1980.

350: AGRICULTURE

	($ billions) 1978	1979	1980	1981
Budget Authority				
January budget estimate.........	3.8	7.2	4.6	4.9
Changes:				
Agricultural credit insurance fund...........	0.1	---	0.1	0.1
Other.....................	*	*	*	*
Current estimate...............	3.9	7.2	4.7	5.0
Outlays				
January budget estimate.........	9.1	5.4	5.0	3.7
Changes:				
Farm price supports.......	-0.4	*	0.1	0.4
Agricultural credit insurance fund...........	*	0.1	0.1	0.1
Other.....................	*	*	*	*
Current estimate...............	8.7	5.6	5.2	4.2

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* $50 million or less.

The changes in the agriculture function since January are largely due to:

-- downward reestimates in price support outlays due to higher than anticipated agricultural commodity prices. Under the program, higher commodity prices reduce Federal loans and payments. Part of this price increase was the result of farmer participation in the grain reserve and the land diversion programs announced in March; and

- some offsetting increases in price support outlays as a result of recent legislation that increased the target price for wheat.

In addition, the current estimates reflect the cost of legislation supported by the Administration that would expand the Federal crop insurance program -- in lieu of continuing some other disaster programs -- and increase credit available to farmers hurt by price drops in recent years.

370: COMMERCE AND HOUSING CREDIT

	($ billions)			
	1978	1979	1980	1981
Budget Authority				
January budget estimate.........	5.4	6.6	7.7	7.5
Changes:				
Consumer Cooperative Bank.	---	0.1	0.1	0.1
Rural housing programs....	---	---	0.2	0.3
Postal Service............	---	-*	0.1	0.1
Other.....................	*	---	*	*
Current estimate................	5.4	6.7	8.2	7.9
Outlays				
January budget estimate.........	3.5	3.0	4.5	3.2
Changes:				
Consumer Cooperative Bank.	---	0.1	0.1	0.1
Housing for the elderly...	-0.2	-0.1	-*	---
Government National Mortgage Association.....	0.1	*	*	-*
Postal Service............	---	-*	0.1	0.1
FDIC and other............	-0.1	-*	*	*
Current estimate................	3.4	3.0	4.7	3.3

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* $50 million or less.

The current estimates of outlays for commerce and housing credit are slightly below the January estimates for 1978 and 1979, and slightly above the January estimates for 1980 and 1981. The current estimates include the recently authorized Consumer Cooperative Bank.

Because postal rate increases were less than anticipated, budget authority and outlays for the Postal Service have been revised downward in 1979 to reflect lower public service payments to the Postal Service. Increased budget authority and outlay reestimates in 1980 and 1981 are due to revenue forgone as a result of the rate increases and an expected increase in mail volume.

The 1978 outlay estimates for several other commerce and housing programs have also been revised. The 1978 outlay estimates for the Government National Mortgage Association (GNMA) have been increased because changes in economic conditions are causing portfolio sales to lag behind previous estimates, thus increasing outlays. In addition, 1978 outlays for housing for the elderly have been revised downward to reflect shortfall experienced in recent months. The estimates for the Federal Deposit Insurance Corporation have also been revised downward because recoveries on assets acquired from bank failures have been higher than anticipated.

400: TRANSPORTATION

	($ billions)			
	1978	1979	1980	1981
Budget Authority				
January budget estimate	15.1	18.6	19.3	19.4
Changes:				
Highways	---	0.1	-*	-*
Mass transit	---	0.2	0.2	0.2
Railroads	*	0.4	0.4	0.2
Air transportation	---	---	*	*
Other	*	*	*	*
Current estimate	15.2	19.3	19.9	19.8
Outlays				
January budget estimate	16.3	17.4	18.5	18.7
Changes:				
Highways	-0.7	-0.4	0.1	0.1
Mass transit	-0.1	*	0.1	0.1
Railroads	0.1	0.2	0.2	0.2
Air transportation	-*	-*	*	*
Other	-0.1	*	*	*
Current estimate	15.4	17.3	18.9	19.2

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* $50 million or less.

The current budget authority estimates for transportation reflect several policy increases to the January budget. The Administration will request additional budget authority for further purchases of ConRail securities. Additional budget authority has been requested for mass transit programs as part of the urban initiative.

Other budget authority increases to the January budget include a supplemental for AMTRAK of $30 million in budget authority in 1978, and a $70 million amendment for 1979 budget authority providing full funding for the reconstruction of the overseas highway through the Florida Keys.

Despite these budget authority increases, the current estimates of total outlays for transportation are only slightly above the January totals for 1979 and 1981 and substantially below the January estimates for 1978. Previous outlay estimates for highway construction were based upon obligation experience factors. Those factors have changed, resulting in current estimates of outlays that are $0.7 billion and $0.4 billion below the January estimates for 1978 and 1979, respectively.

450: COMMUNITY AND REGIONAL DEVELOPMENT

	($ billions)			
	1978	1979	1980	1981
Budget Authority				
January budget estimate.........	8.7	7.7	7.7	7.5
Changes:				
Urban initiatives:				
National Development Bank 1/...............	---	3.4	4.4	4.4
Labor-intensive public works.................	---	1.0	1.0	1.0
State incentive grants.	---	0.2	0.2	0.2
Other urban initiatives	---	0.2	0.2	0.2
Other changes:				
Inland energy impact assistance............	---	0.2	0.2	0.2
Disaster loans and relief................	0.9	---	---	---
Other..................	0.1	*	*	*
Current estimate................	9.7	12.7	13.6	13.5
Outlays				
January budget estimate.........	9.7	8.7	8.0	7.3
Changes:				
Urban initiatives:				
National Development Bank 1/...............	---	0.1	0.7	1.0
Labor-intensive public works.................	---	0.1	0.9	1.0
State incentive grants.	---	*	0.1	0.2
Other urban initiatives	---	0.1	0.2	0.2
Other changes:				
Local public works.....	0.7	---	-0.7	---
Inland energy impact assistance............	---	*	0.1	0.2
Disaster loans and relief................	0.5	0.4	---	---
Other..................	-0.3	-0.1	*	0.2
Current estimate................	10.5	9.4	9.3	9.9

1/ Includes funds transferred from HUD and EDA.
* $50 million or less.

Budget authority and outlays for community and regional development programs have increased substantially since January due largely to the urban initiatives that the President announced in late March. For 1979, these increases are largely offset by a decrease in the allowances for contingencies, the amounts for which anticipated the urban initiative. The following components of the urban initiative are classified in this function:

-- The National Development Bank, which will offer financial incentives to private sector businesses to remain, expand, or locate in distressed areas, and would expand the flow of development capital to these areas. Bank projects would increase the number of new permanent, private sector employment opportunities in economically-distressed areas and strengthen the fiscal and economic condition of these areas. Grants funded through EDA and HUD will provide financing to firms for up to 15% of fixed asset capital cost.

-- The new labor-intensive public works program, emphasizing the training and hiring of disadvantaged workers to rehabilitate and renovate public facilities. Budget authority of $1.0 billion a year is being requested for 1979 through

1981. Outlays are estimated to rise from $0.1 billion in 1979 to $1.0 billion in 1981.

-- State incentive grants, to encourage States to implement strategies for: (1) instituting fiscal and structural reform programs, and (2) reallocating investment and development resources to assist local communities suffering from economic distress and decline or disorderly growth. Budget authority of $200 million per year is included for 1979 through 1981. Outlays are estimated to grow from $10 million in 1979 to $160 million in 1981.

-- Neighborhood self-help development grants, which would provide direct Federal assistance to local voluntary groups to help support specific neighborhood revitalization projects. Budget authority of $15 million per year is included for 1979 through 1981.

-- Livable cities program, which will provide Federal grants to States, communities, and local groups for neighborhood- or community-based arts programs to help revitalize urban communities, especially distressed urban neighborhoods.

Components of the urban initiative classified in other functions include supplementary fiscal assistance (in the general purpose fiscal assistance function), and urban parks (in the natural resources and environment function). The urban initiative also includes increases to on-going programs for social services, mass transit, health services, and law enforcement.

In addition to the urban initiative, the current estimates for community and regional development reflect a number of other changes. Initially, outlays for the second round of local public works authorized last year fell below expectations. In recent months, however, actual outlays have increased markedly. As a result, the outlay estimates for 1978 have been revised upward by $0.7 billion, with a corresponding decrease in 1980 outlays. The current estimates for 1979-1981 also include the President's recent proposal to provide assistance to State and local governments to deal with the adverse consequences of rapid inland energy development. Budget authority of $150 million a year will be requested. The $0.9 billion increase in budget authority for disaster loans and relief was enacted because of the severe winter weather in New England and the Midwest and flooding in the Southwest and California. About

$0.5 billion of these funds are expected to be spent in 1978, and the remainder in 1979.

The 1978 outlay estimates for several community development programs, principally the urban renewal program, have been reestimated downward because communities are not spending the funds as rapidly as anticipated.

NEW URBAN INITIATIVES, 1979-1981 1/
(in billions of dollars)

Function and Program	Budget Authority 1979	Budget Authority 1980	Budget Authority 1981	Outlays 1979	Outlays 1980	Outlays 1981
Natural Resources and Environment						
Environmental programs (EPA)	*	*	*	*	*	*
Urban parks and recreation facilities (Interior)	0.2	0.2	0.2	*	0.1	0.1
Total, Natural resources and environment	0.2	0.2	0.2	*	0.1	0.1
Transportation						
Multi-modal transportation demonstration grants (UMTA)	0.2	0.2	0.2	---	0.1	0.2
Community and Regional Development						
Public works (Department of Commerce program emphasizing rehabilitation and renovation of public facilities, and training and hiring of disadvantaged workers)	1.0	1.0	1.0	0.1	0.9	1.0
National Development Bank: 2/						
Grants to firms for up to 15% of fixed asset capital costs (HUD and EDA)	0.6	0.6	0.6	0.1	0.4	0.5
Coverage of loan losses from loan guarantees	0.7	1.0	1.0	0.1	0.2	0.3
Interest rate subsidies (lower rate to 2.5%) on loans	1.0	1.4	1.4	*	0.1	0.1
Interest subsidy on first $20 million of new investment in facilities in economically-depressed areas	0.2	0.3	0.4	*	*	*
Secondary loan market	0.8	1.1	1.1	---	---	---
Other (expenses, Director's funds)	*	*	*	*	*	*
Loan guarantees: Up to 3/4 of remaining capital costs up to $15 million (these figures represent guarantee authority)	(2.2)	(2.9)	(2.9)	(2.2)	(2.9)	(2.9)
Subtotal, National Development Bank 2/	3.4	4.4	4.4	0.1	0.7	1.0

See footnotes at end of table.

NEW URBAN INITIATIVES, 1979-1981 1/ (continued)

Function and Program	Budget Authority 1979	Budget Authority 1980	Budget Authority 1981	Outlays 1979	Outlays 1980	Outlays 1981
Community and Regional Development (continued)						
Increased funding for housing rehabilitation loan program (section 312) (HUD)	0.2	0.2	0.2	0.1	0.1	0.2
State incentive grant program (Federal grants for States to use in assisting distressed communities, HUD)	0.2	0.2	0.2	*	0.1	0.2
Self-help development program (HUD)	*	*	*	*	*	*
Livable cities (National Endowment for the Arts/HUD grants program for urban design and arts)	*	*	*	*	*	*
Community development credit unions (CSA)	*	---	---	*	---	---
"Certificate of Necessity": Investment tax credit (these figures represent reduction in receipts)	(*)	(0.1)	(0.1)	(*)	(0.1)	(0.1)
Total, Community and regional development	4.8	5.8	5.8	0.3	1.8	2.3
Education, Training, Employment, and Social Services						
Urban social services initiative (HEW)	0.1	0.1	0.1	0.1	0.1	0.1
Other	0.1	0.1	0.1	*	0.1	0.1
Targeted employment tax credit (credits for hiring disadvantaged workers aged 18 to 24 and the handicapped. These figures represent a reduction in receipts) 1/	(0.2)	(0.8)	(1.2)	(0.2)	(0.8)	(1.2)
Total, Education, training, employment, and social services	0.2	0.2	0.2	0.2	0.2	0.2

See footnotes at end of table.

NEW URBAN INITIATIVES, 1979-1981 1/ (continued)

Function and Program	Budget Authority			Outlays		
	1979	1980	1981	1979	1980	1981
General Purpose Fiscal Assistance						
Increase limit on tax-exempt or taxable industrial revenue bonds to $20 million in economically-distressed areas (interest subsidy).............	0.1	0.1	0.1	*	*	*
Supplementary fiscal assistance program (replaces antirecession (countercyclical) fiscal assistance)....................................	0.8	1.0	1.0	1.0	1.0	1.0
Antirecession fiscal assistance..................	-0.4	-0.3	---	-0.6	-0.3	---
Total, General purpose fiscal assistance..	0.4	0.7	1.0	0.4	0.7	1.0
Other (health and anti-crime programs)..............	0.1	0.1	0.1	*	*	*
Totals						
Budget authority and outlays......................	5.9	7.1	7.5	1.0	2.8	3.9
Revenue reductions..............................	0.2	0.8	1.3	0.2	0.8	1.3
Loan guarantees..................................	2.2	2.9	2.9	---	---	---

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1/ Figures shown are changes from March 13, 1978 budget estimates.

2/ Includes HUD and EDA grants, which are not included in the account entitled "National Development Bank."

* $50 million or less.

500: EDUCATION, TRAINING, EMPLOYMENT, AND SOCIAL SERVICES

	($ billions)			
	1978	1979	1980	1981
Budget Authority				
January budget estimate	22.8	33.6	34.1	35.2
Changes:				
Education:				
Higher education	---	1.2	1.2	1.1
Other	---	*	0.2	0.1
Training and employment:				
Temporary employment assistance	---	---	-2.0	0.7
Welfare reform	---	---	-0.5	0.2
Other	0.1	-*	*	*
Social services:				
Retroactive social service claims	-0.5	0.5	---	---
Other	-*	0.2	0.2	0.2
Current estimate	22.3	35.6	33.2	37.5
Outlays				
January budget estimate	27.5	30.4	33.2	35.3
Changes:				
Education:				
Higher education	-*	0.2	1.2	1.2
Other	-0.1	0.1	0.1	0.1
Training and employment:				
Temporary employment assistance	-0.1	---	-1.2	0.7
Welfare reform	---	---	-0.3	0.2
Other	-0.1	-*	*	*
Social services:				
Retroactive social service claims	-0.5	0.5	---	---
Other	-*	0.2	0.2	0.2
Current estimate	26.6	31.4	33.1	37.6

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* $50 million or less.

The current estimates for higher education are above the budget estimates largely because of the middle income assistance proposal, which the President announced in February. The current estimates also reflect reestimates for several education programs and revised proposals for elementary and secondary education.

The estimates for employment and training in 1978 and 1979 are not substantially different from the January estimates. The 1978 outlays for employment and training were revised downward slightly in March as a result of shortfall experienced earlier this year; 1978 budget authority has been increased by congressional enactment of an unrequested supplemental of $63 million for summer youth programs. The estimates for the jobs portion of welfare reform have been adjusted in 1980 and 1981 to reflect reestimates in program costs.

Temporary employment assistance (countercyclical public jobs) has been reestimated to reflect the current economic assumptions and the provisions of the Administration's legislative proposals submitted after the January budget. The countercyclical jobs proposal calls for outlays of $1 billion when the unemployment rate is 4.75%, and another $1 billion for each half percentage point increase above that level. The 1980 estimate presented here assumes that the unemployment rate falls below 5.75% by the end of fiscal year 1979. If the rate of unemployment fell more slowly than forecast, estimated spending for this program would be $1 billion higher.

The current estimates for social services, like the estimates issued in March, reflect a shift in the payment of $0.5 billion retroactive social service claims from 1978 to 1979. In addition, the current estimates reflect the increase in social service grants to areas of special need, which is part of the urban initiative.

550: HEALTH

	1978	1979	1980	1981
	($ billions)			
Budget Authority				
January budget estimate.........	46.5	52.6	58.8	68.8
Changes:				
Medicare..................	0.2	0.1	-0.5	-0.4
Medicaid..................	---	-0.1	*	0.4
Other.....................	*	*	-0.3	-0.4
Current estimate................	46.7	52.7	58.1	68.5
Outlays				
January budget estimate.........	44.3	49.7	53.7	58.2
Changes:				
Medicare:				
Proposed legislation...	*	0.1	1.1	1.3
Existing law...........	-0.4	0.1	0.1	0.1
Medicaid:				
Proposed legislation...	*	0.4	0.7	1.1
Existing law...........	-0.2	-0.5	-0.7	-0.7
Other.....................	*	0.1	0.1	0.1
Current estimate................	43.8	49.8	55.0	60.2

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* $50 million or less.

The current estimates for health outlays are slightly below the January estimates for 1978, but are above the January estimates for 1980 and 1981.

The largest changes are in the estimates for medicare. While the estimates of medicare outlays under existing law have not changed substantially, the estimates for proposed legislation in 1980 and 1981 have increased by over $1 billion since January. Most of this increase is due to the correction of errors in the January estimates. The current estimates also assume that hospital cost containment legislation will become effective in October, rather than in July, of 1978.

The current estimates of total outlays for medicaid are slightly below the January estimates for 1978-1979, virtually the same for 1980, and up slightly for 1981. A recent determination that the savings from the medicaid quality control program can be achieved without legislation accounts for much of the increase in the estimates for proposed legislation. This is offset by a corresponding decrease in the estimates under existing law. The current medicaid estimates also reflect the assumed 3-month delay in cost-savings legislation and small reestimates in the costs of both existing and proposed benefits.

The current estimates of budget authority for discretionary programs in 1979-1981 reflect the $50 million increase in health services programs included in the President's urban initiative proposals. The decrease in budget authority for discretionary programs in 1980 and 1981 -- $0.3 billion and $0.4 billion, respectively -- is due almost entirely to an error in the January estimates for advanced funding of certain health services programs.

600: INCOME SECURITY

	($ billions)			
	1978	1979	1980	1981
Budget Authority				
January budget estimate 1/	181.3	191.8	215.9	236.8
Changes:				
Social security and railroad retirement	0.1	1.0	0.4	-1.5
Disabled coal miners benefits	*	0.5	0.5	0.4
Unemployment compensation	-0.8	-1.7	-0.5	-0.2
Federal employee retirement and disability	*	0.1	0.1	0.1
Crude oil equalization rebates	-0.2	-0.4	0.1	0.2
Other	-0.2	-0.2	0.8	1.0
Current estimate	180.3	191.1	217.3	236.8
Outlays				
January budget estimate 1/	148.6	160.9	175.2	190.9
Changes:				
Social security and railroad retirement	-0.5	-0.6	0.3	1.2
Proposed legislation	*	0.3	0.3	0.2
Disabled coal miners benefits	*	0.3	0.5	0.4
Unemployment compensation	-0.6	-0.7	-0.5	-*
Federal employee retirement and disability	-0.1	0.1	0.1	0.1
Crude oil equalization rebates	-0.2	-0.4	0.1	0.2
Food programs	-0.3	-0.1	0.8	1.1
Other	-0.1	-0.1	-0.2	-0.2
Current estimate	146.9	159.6	176.6	193.9

1/ Revised to include earned income credit payments in excess of an individual's tax liability, formerly treated as as income tax refunds. See general note with the Table of Contents.

* $50 million or less.

Most of the change in outlays for the income security function reflects lower estimates as a result of lower than anticipated beneficiary levels, which are offset -- in 1980 and 1981 -- by higher than expected cost-of-living adjustments.

Outlays for unemployment compensation have been reestimated downward for 1978 through 1981 because of the improvement in the economy. Legislation proposed in the budget that would have lowered the Federal unemployment insurance payroll tax rate is not included for the Mid-Session Review. The outlay estimates for a number of welfare and retirement programs also have been revised downward for 1978 and 1979, consistent with actual experience in recent months.

For 1980 and 1981, some downward outlay revisions have been offset by higher than expected cost-of-living adjustments for retirement and welfare programs. Outlays for social security and railroad retirement have been revised upward by about $0.6 billion in 1980 and $1.4 billion in 1981.

The current estimates for 1979-1981 also reflect several changes in enacted or proposed legislation. They reflect a loss of savings for social security resulting from delays in the effective dates of the student benefit and the minimum benefit limitations. The assumed effective date for student benefit legislation has been delayed one year to July 1, 1979, while the minimum benefit legislation is now assumed to be effective January 1, 1979. In addition, the estimates for the black lung program have increased since January, largely because of recently enacted benefit increases. Finally, the current estimates assume that the crude oil equalization rebates will be enacted effective January 1979, which decreases outlays in both 1978 and 1979. The increases in the estimated outlays for the rebates in 1980 and 1981 are due to reestimates.

The earned income credit payments were treated as income tax refunds in the 1979 budget. They are now reclassified as outlays, and the January budget estimates have been adjusted in order to make them comparable with the current estimates.

700: VETERANS BENEFITS AND SERVICES

	($ billions) 1978	 1979	 1980	 1981
Budget Authority				
January budget estimate.........	19.1	19.1	19.7	20.0
Changes:				
Compensation and pensions (proposed legislation)...	---	0.6	0.6	0.6
Medical care..............	---	*	-0.1	-0.1
Other.....................	---	---	*	*
Current estimate................	19.1	19.7	20.2	20.5
Outlays				
January budget estimate.........	18.9	19.3	19.7	19.9
Changes:				
Compensation and pensions (proposed legislation)...	*	0.6	0.5	0.6
Medical care..............	-0.1	-*	-0.1	-0.1
Other.....................	-*	-*	*	*
Current estimate................	18.8	19.8	20.1	20.4

---

* $50 million or less.

The major changes in budget authority and outlays for the veterans benefits and services function are the result of reestimates and changes in proposed legislation for veterans compensation and pensions.

The current estimate of outlays for compensation and pensions is $0.6 billion above the January estimates for

1979, 1980, and 1981. These increases are due to two factors:

-- changes in legislative proposals for reform of the pension system; and

-- higher cost-of-living adjustments than anticipated in January.

Since the January budget submission, the Administration's position on pension reform has been developed in greater detail. The current reform proposal anticipates a $519 million greater first-year cost than allowed in the 1979 budget. In addition, the current estimates assume a 6.9% cost-of-living increase for compensation effective October 1, 1978, compared to the 5.8% assumed in the January budget.

Outlays for medical care in 1978 have been revised downward slightly due to construction slippages, which have resulted in delays in opening facilities. Other medical care outlay decreases are due to a reestimate of the savings associated with proposed legislation.

750: ADMINISTRATION OF JUSTICE

	($ billions)			
	1978	1979	1980	1981
Budget Authority				
January budget estimate.........	3.9	4.1	4.2	4.2
Changes.....................	*	0.2	0.1	0.1
Current estimate................	3.9	4.3	4.3	4.3
Outlays				
January budget estimate.........	4.0	4.2	4.3	4.3
Changes.....................	-0.1	0.2	0.1	0.1
Current estimate................	4.0	4.4	4.4	4.4

---

* $50 million or less.

The current estimates for administration of justice reflect several policy initiatives of the Department of Justice not included in the January budget. These initiatives include the Judgeship Bill, which would increase the number of Federal judges by one-third; the Alien Adjustment and Employment Act, which would deal with the problem of undocumented aliens; and the Victims of Crime Act, which would compensate victims of certain crimes.

800: GENERAL GOVERNMENT 1/

	1978	1979	1980	1981
	($ billions)			
Budget Authority				
January budget estimate.........	4.1	4.4	4.6	4.4
Changes......................	-0.1	-*	*	-*
Current estimate................	4.0	4.3	4.6	4.4
Outlays				
January budget estimate.........	4.1	4.3	4.6	4.3
Changes......................	-0.3	-0.1	-*	-*
Current estimate................	3.8	4.2	4.6	4.3

1/ Adjusted for on-budget status of the administrative costs of the Exchange Stabilization Fund.

* $50 million or less.

Budget authority and outlays for programs in the general government function are slightly different from estimates contained in the January budget for 1978 through 1981. These changes are due to minor reestimates in various programs.

850: GENERAL PURPOSE FISCAL ASSISTANCE

	($ billions)			
	1978	1979	1980	1981
Budget Authority				
January budget estimate.........	9.7	16.6	15.8	20.5
Changes:				
Supplementary fiscal assistance...............	---	0.8	1.0	1.0
Antirecession fiscal assistance..............	---	-1.0	-0.3	---
Taxable municipal bond option..................	---	-1.7	0.1	-1.2
Other.....................	*	-*	-*	*
Current estimate................	9.7	14.6	16.6	20.3
Outlays				
January budget estimate.........	9.9	9.6	9.4	9.5
Changes:				
Supplementary fiscal assistance...............	---	1.0	1.0	1.0
Antirecession fiscal assistance..............	-0.2	-1.0	-0.3	---
Taxable municipal bond option..................	---	-*	-0.1	-0.1
Other.....................	-*	-*	-*	*
Current estimate................	9.6	9.5	9.9	10.4

---

* $50 million or less.

As part of the urban initiative, the President proposed a new program of supplementary fiscal relief to replace the existing temporary antirecession program, which is tied to the rate of unemployment. The new program will make payments to those local jurisdictions that are experiencing fiscal stress as measured by unemployment rates and below-average rates of economic growth. Outlays for supplementary fiscal assistance are proposed at $1.0 billion a year beginning in 1979. The current estimates assume that antirecession fiscal assistance will be terminated at the end of fiscal year 1978, and that the carryover of unobligated budget authority ($0.3 billion) will be transferred to the new program. Therefore, only $0.8 billion in new budget authority is required for 1979.

The January estimates of budget authority for the taxable municipal bond option were inadvertently made on a calendar year basis. The current estimates, like those issued in March, correct that error. The current estimates also reflect the increased limit on bonds issued in economically distressed areas, proposed as part of the urban initiative, and minor reestimates. The current estimates assume that the proposal will become effective in fiscal year 1980.

900: INTEREST

	($ billions)			
	1978	1979	1980	1981
Budget Authority and Outlays				
January budget estimate.........	43.8	49.0	53.7	56.5
Changes:				
Interest on the public debt.....................	---	---	2.1	3.1
Other interest...........	-0.1	*	-0.1	-0.2
Current estimate...............	43.8	49.0	55.7	59.4

---

* $50 million or less.

The current estimates for the interest function in 1978 and 1979 are nearly the same as those in the January budget. The effects of decreases in the estimated deficits for 1978 and 1979 -- about $11 billion in each year -- are offset by higher interest rates. Short-term interest rates were 6.6% when these estimates were made, compared to the 6.1% assumed in the January budget.

The interest estimates for 1980 and 1981 have been revised upward to reflect the higher interest rates and the higher deficits estimated for these years.

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920: ALLOWANCES

	($ billions)			
	1978	1979	1980	1981
Budget Authority				
January budget estimate.........	---	4.2	5.1	9.1
Changes:				
Contingencies.............	---	-3.0	2.1	1.3
Civilian agency pay raises.................	---	-0.1	-*	-*
Current estimate...............	---	1.1	7.2	10.4
Outlays				
January budget estimate.........	---	2.8	5.8	9.7
Changes:				
Contingencies.............	---	-1.7	0.4	-0.3
Civilian agency pay raises.................	---	-*	-*	-*
Current estimate................	---	1.1	6.2	9.4

---

* $50 million or less.

The January budget estimates included allowances for civilian agency pay raises (1979-1981), the effects of inflation on civilian agency purchases of goods and services (1980-1981), and unforeseen contingencies (1979-1981). Allowances for civilian agency pay raises have been reduced slightly since January to reflect the President's intention to recommend a limit of 5.5% on the Federal pay increase that is to become effective in October 1978. The estimates include $1.1 billion in outlays in 1979 for these pay raises. In subsequent years, the allowance assumes a 6% per year increase in Federal pay. Presidential decisions on the appropriate size of future Federal pay raises will not be made until the year in which pay raises occur. The estimates include $2.3 billion and $3.6 billion for 1980 and 1981, respectively, for these estimated pay raises.

The allowances for inflation have increased slightly since January as a result of higher projected rates of inflation. This allowance is now $1.9 billion in 1980 and $3.8 billion in 1981. The allowance for contingencies in 1979 has been allocated to specific programs, such as the urban initiative, and has been eliminated. For 1980 and 1981, this allowance for other contingencies is $3.0 billion in budget authority and $2.0 billion in outlays.

950: UNDISTRIBUTED OFFSETTING RECEIPTS

	($ billions) 1978	1979	1980	1981
Budget Authority and Outlays				
January budget estimate.........	-15.6	-16.0	-17.6	-19.5
Changes:				
Offshore oil receipts.....	-0.4	-0.5	---	---
Interest received by trust funds..............	-*	-0.1	0.3	1.0
Employer share, employee retirement..............	*	*	*	0.1
Current estimate................	-16.1	-16.6	-17.3	-18.4

---

* $50 million or less.

The current estimates for undistributed offsetting receipts in 1978 and 1979 are above the January estimates, reflecting revisions to estimated receipts from offshore oil sales and larger interest payments to trust funds. These increases result in lower outlays and budget authority for those years. The estimates for interest received by trust funds for 1980 and 1981 are lower than the January budget, reflecting technical adjustments to the estimates.

Part 3

SUPPLEMENTARY LONG-RANGE INFORMATION

This section presents long-range projections of receipts, outlays, and budget authority. As required by law, it also contains projected outlays for open-ended programs and fixed costs, and spending from balances of budget authority for non-mandatory programs.

Long-Range Economic Assumptions

The long-range economic assumptions differ in nature from the short-range economic forecast presented earlier. They are not forecasts of economic events, but projections that assume progress in moving toward a more fully-employed economy and greater price stability.

The economy is assumed to grow in real terms by an average of just over 4% for the entire 1980-83 period. The rate of unemployment drops to 4.0% by the end of calendar year 1983. With the real GNP growth assumed, a successful targeting of Federal employment and training programs will be necessary to achieve this optimistic goal. The rate of inflation is projected to drop by half a percentage point a year, reaching 4.5% by the end of the period.

Budget Projections

As is the case with the underlying economic assumptions, the long-range budget projections for 1982 and 1983 are not forecasts. For the most part, they are extrapolations -- based in part upon the economic assumptions shown above -- of the costs of programs proposed in the 1979-81 multi-year planning base. The projections are, therefore, an estimate of the degree to which future resources are or would be committed by current law and Administration policy. They include the projected budget impact of the major Administration intiatives in the following areas:

-- energy;
-- education;
-- agriculture;
-- welfare reform;
-- water resources;
-- urban assistance; and
-- tax reform and relief.

Since the timing and form of the proposal are still under consideration, the projections do not include funds for national health insurance.

As shown in Table 17, outlays are projected to rise $174.9 billion, from $496.6 billion in 1979 to $671.5

billion in 1983. Receipts are projected to increase more rapidly, from $448.2 billion in 1979 to $720.5 billion in 1983. The budget is projected to be in surplus during 1982 and 1983.

Table 17.--THE BUDGET OUTLOOK, 1979-1983
(in billions of dollars)

	1979	1980	1981	1982	1983
Outlays	496.6	549.4	591.3	631.0	671.5
Receipts	448.2	507.3	580.0	651.3	720.5
Surplus or deficit (-)	-48.5	-42.7	-11.3	20.3	49.0
Budget authority	571.4	625.2	680.6	728.8	768.8

However, the long-range receipts and outlays projections are sensitive to changes in the underlying assumptions, especially those concerning future economic conditions. The deficits and surpluses shown above could vary markedly if the economy did not follow the assumed path and should be considered in that light. Additional information on projected receipts, budget authority, and outlays is provided in the tables at the end of this section.

Projections of Outlays for Open-Ended Programs and Fixed Costs

Outlay projections for open-ended programs and fixed costs are shown in Table 26.

These projections indicate that, under existing legislation, payments for individuals are estimated to grow by roughly 9.4% a year from 1979 to 1983. Outlays for net interest are expected to increase through 1981 and decline thereafter. Outlays for other open-ended programs and fixed costs are projected to decline over the 1979-83 period.

Spending from Balances of Budget Authority Available at the End of Fiscal Year 1979: Non-Mandatory Programs

Section 221(b) of the Legislative Reorganization Act of 1970 amended the Budget and Accounting Act of 1921 to require that the President shall transmit to the Congress "summaries of estimated expenditures, in fiscal years following such ensuing fiscal year (1979 this year), of balances carried over from such ensuing fiscal year." Table 27 contains these estimates.

The current estimate of the balances at the end of fiscal year 1979 for programs that have controllable outlays is $276.1 billion. About $16.4 billion of this total is in guarantee and insurance program balances, very little of which is expected ever to be spent. The spending pattern from the balances in other programs, which amount to $259.6 billion, is fairly consistent among the programs. The bulk of the spending from balances takes place in 1980, and declines rapidly thereafter. About 46% is expected to be spent in 1980 and approximately 22% in 1981. About 11% ($29.1 billion) is expected to remain unexpended at the end of fiscal year 1983. An estimated $19.5 billion of the 1979 end-of-year balances is expected to expire (without being spent) during fiscal years 1980 through 1983.

Table 18.--LONG-RANGE ECONOMIC ASSUMPTIONS, 1980-1983
(calendar years; dollar amounts in billions)

	Assumed for Purposes of Budget Projections			
	1980	1981	1982	1983
Gross national product				
Current dollars:				
Amount	2,576	2,838	3,107	3,383
Percent change	10.6	10.2	9.5	8.9
Constant (1972) dollars):				
Amount	1,512	1,576	1,640	1,706
Percent change	4.1	4.2	4.1	4.0
Incomes (current dollars)				
Personal income	2,099	2,307	2,522	2,741
Wages and salaries	1,363	1,502	1,647	1,793
Corporate profits	233	263	292	321
Prices (percent change)				
GNP deflator:				
Year over year	6.2	5.7	5.2	4.7
Fourth quarter over fourth quarter	6.0	5.5	5.0	4.5
CPI:				
Year over year	6.2	5.7	5.2	4.7
December over December	6.0	5.5	5.0	4.5
Unemployment rates (percent)				
Total:				
Yearly average	5.4	4.9	4.4	4.1
Fourth quarter	5.2	4.7	4.3	4.0
Insured 1/	3.1	2.8	2.5	2.3
Federal pay raise, October (percent)	6.0	6.0	6.0	6.0
Interest rate, 91-day Treasury bills (percent) 2/	6.6	6.3	5.75	5.25

1/ Insured unemployment as a percentage of covered employment; includes unemployed workers receiving extended benefits.

2/ Average rate of new issues within period.

Table 19.--ESTIMATED EFFECT OF LEGISLATION ON RECEIPTS, 1979-1983
(in billions of dollars)

	Current Estimate			Projection	
	1979	1980	1981	1982	1983
Receipts under current law	470.1	535.1	612.0	692.1	768.1
Extension of temporary tax provisions:					
Individual income taxes	-6.6	-11.0	-11.9	-13.0	-13.7
Corporation income taxes	-0.9	-2.1	-4.0	-6.8	-8.0
Excise taxes	---	4.4	5.5	5.7	5.9
Subtotal, Extensions	-7.5	-8.6	-10.4	-14.1	-15.8
Receipts on a current services basis	462.6	526.5	601.6	678.0	752.3
Proposed legislation:					
Income tax reductions and reforms (January 1979):					
Individuals	-10.6	-15.9	-18.9	-22.4	-26.9
Corporations	-3.5	-5.9	-6.3	-7.1	-8.5
Energy tax proposals	0.1	3.0	4.4	5.6	8.0
Welfare reform (expanded earned income credit)	---	---	---	-0.8	-2.2
Urban initiatives	-0.2	-0.8	-1.3	-1.4	-1.4
Acceleration of State and local deposits of social security taxes 1/	---	1.1	1.5	0.3	0.2
Other	-0.2	-0.6	-1.0	-0.9	-1.0
Subtotal, Proposed legislation	-14.4	-19.2	-21.5	-26.7	-31.7
Current estimate	448.2	507.3	580.0	651.3	720.5

1/ This can be accomplished by administrative action.

Table 20.--BUDGET RECEIPTS BY MAJOR SOURCE, 1978-1983 1/
(in billions of dollars)

		Current Estimate			Projection	
	1978	1979	1980	1981	1982	1983
Individual income taxes...........................	182.0	200.1	226.1	260.4	298.2	336.5
Corporation income taxes..........................	59.0	60.8	65.8	74.9	83.3	91.8
Social insurance taxes and contributions........	123.6	142.3	160.9	185.3	206.8	224.6
Excise taxes..	18.2	24.6	32.5	36.0	37.5	39.9
Estate and gift taxes...............................	5.2	5.7	6.0	6.3	6.9	7.6
Customs duties.......................................	6.1	6.7	7.4	8.2	9.0	9.8
Miscellaneous receipts.............................	7.1	8.0	8.6	9.0	9.7	10.4
Total budget receipts..................	401.2	448.2	507.3	580.0	651.3	720.5

1/ Earned income credit payments in excess of an individual's tax liability, formerly treated as income tax refunds, are now classified as outlays. See general note with the Table of Contents.

Table 21.--COMPOSITION OF BUDGET OUTLAYS, 1977-1983 1/
(dollar amounts in billions)

	Actual	Current Estimate				Projection	
	1977	1978	1979	1980	1981	1982	1983
National defense:							
Direct Federal payments to individuals	$8.2	$9.2	$10.2	$11.2	$12.2	$13.2	$14.2
Grants to States and localities	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Other	89.2	95.0	104.2	114.2	124.6	136.7	149.3
Subtotal, National defense	97.5	104.2	114.6	125.5	136.9	150.0	163.5
Nondefense:							
Direct Federal payments to individuals	159.6	170.8	187.8	207.4	229.5	255.5	278.0
Payments for individuals through States and localities	23.0	24.9	26.8	29.5	30.1	26.7	28.9
All other grants to States and localities	45.3	53.0	57.9	60.7	67.0	70.1	70.3
Net interest	30.0	35.1	39.8	45.7	48.7	47.4	45.6
Other	47.4	64.3	69.8	80.5	79.1	81.3	85.1
Subtotal, Nondefense	305.3	348.1	382.1	423.8	454.4	481.1	508.0
Total	402.8	452.3	496.6	549.4	591.3	631.0	671.5

See footnote at end of table.

Table 21 (continued)

	Actual	Current Estimate				Projection	
	1977	1978	1979	1980	1981	1982	1983
Percent of Total Outlays							
National defense:							
Direct Federal payments to individuals.....	2.0	2.0	2.1	2.0	2.1	2.1	2.1
Grants to States and localities............	*	*	*	*	*	*	*
Other......................................	22.1	21.0	21.0	20.8	21.1	21.7	22.2
Subtotal, National defense............	24.2	23.0	23.1	22.9	23.1	23.8	24.4
Nondefense:							
Direct Federal payments to individuals.....	39.6	37.8	37.8	37.8	38.8	40.5	41.4
Payments for individuals through States and localities............................	5.7	5.5	5.4	5.4	5.1	4.2	4.3
All other grants to States and localities..	11.2	11.7	11.7	11.0	11.3	11.1	10.5
Net interest...............................	7.4	7.8	8.0	8.3	8.2	7.5	6.8
Other......................................	11.8	14.2	14.0	14.6	13.4	12.9	12.7
Subtotal, Nondefense..................	75.8	77.0	76.9	77.1	76.9	76.2	75.6
Total.................................	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1/ Earned income credit payments in excess of an individual's tax liability, formerly treated as income tax refunds, are now classified as outlays. See general note with the Table of Contents.

* 0.05% or less.

Table 22.--BUDGET OUTLAYS BY FUNCTION, 1977-1983
(in billions of dollars)

	Actual	Current Estimate				Projection	
	1977 1/	1978	1979	1980	1981	1982	1983
National defense	97.5	104.2	114.6	125.5	136.9	150.0	163.5
International affairs	4.8	6.5	7.4	8.3	8.8	9.4	10.5
General science, space and technology	4.7	4.8	5.1	5.3	5.2	4.8	4.4
Energy	4.2	6.3	10.4	11.0	8.5	7.5	6.7
Natural resources and environment	10.0	11.5	11.8	12.9	13.9	13.6	13.3
Agriculture	5.5	8.7	5.6	5.2	4.2	4.4	5.5
Commerce and housing credit	-*	3.4	3.0	4.7	3.3	3.1	3.0
Transportation	14.6	15.4	17.3	18.9	19.2	19.4	19.4
Community and regional development	6.3	10.5	9.4	9.3	9.9	10.1	9.5
Education, training, employment, and social services	21.0	26.6	31.4	33.1	37.6	40.2	40.6
Health	38.8	43.8	49.8	55.0	60.2	65.7	71.7
Income security	137.9	146.9	159.6	176.6	193.9	210.7	229.1
(Social security)	(83.9)	(92.6)	(102.8)	(114.1)	(126.0)	(138.7)	(151.3)
(Other)	(54.0)	(54.3)	(56.9)	(62.5)	(67.9)	(72.1)	(77.8)
Veterans benefits and services	18.0	18.8	19.8	20.1	20.4	20.7	21.1
Administration of justice	3.6	4.0	4.4	4.4	4.4	4.3	4.4
General government	3.4	3.8	4.2	4.6	4.3	4.3	4.2
General purpose fiscal assistance	9.5	9.6	9.5	9.9	10.4	11.0	11.7
Interest	38.1	43.8	49.0	55.7	59.4	59.1	58.6
Allowances	---	---	1.1	6.2	9.4	12.6	15.8
Undistributed offsetting receipts:							
Employer share, employee retirement	-4.5	-5.0	-5.1	-5.5	-5.9	-6.3	-6.7
Interest received by trust funds	-8.1	-8.6	-9.2	-10.0	-10.7	-11.7	-13.0
Rents and royalties on the Outer Continental Shelf	-2.4	-2.4	-2.3	-1.8	-1.8	-1.8	-1.8
Total budget outlays	402.8	452.3	496.6	549.4	591.3	631.0	671.5
Memorandum							
Outlays of off-budget Federal entities	8.7	11.0	12.9	10.2	10.8	11.8	11.3
Outlays including off-budget Federal entities	411.5	463.3	509.5	559.5	602.1	642.8	682.8

1/ The 1977 actual data have been adjusted for accounting changes. See general note with the Table of Contents.

* $50 million or less.

Table 23.--BUDGET OUTLAYS BY AGENCY, 1977-1983
(in billions of dollars)

	Actual	Current Estimate				Projection	
	1977 1/	1978	1979	1980	1981	1982	1983
Legislative branch	1.0	1.0	1.2	1.3	1.1	1.2	1.2
The Judiciary	0.4	0.5	0.5	0.5	0.5	0.6	0.6
Executive Office of the President	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Funds appropriated to the President	2.5	5.2	5.4	5.1	5.2	5.5	6.4
Agriculture	16.7	21.6	18.0	19.6	19.4	20.5	22.3
Commerce	2.6	5.2	4.6	4.7	4.1	4.0	3.4
Defense-Military 2/	95.7	102.0	112.0	122.7	134.0	147.2	160.8
Defense-Civil	2.3	2.5	2.6	2.9	2.9	2.8	2.8
Energy	5.2	6.6	10.2	11.5	9.0	8.1	7.3
Health, Education, and Welfare	147.5	163.3	181.3	201.0	220.7	239.6	259.4
Housing and Urban Development	5.8	8.0	9.4	11.9	12.8	14.0	15.2
Interior	3.2	3.9	4.0	4.3	4.4	4.4	4.5
Justice	2.3	2.5	2.7	2.7	2.6	2.6	2.6
Labor	22.4	22.9	24.7	24.7	28.5	30.1	30.3
State	1.1	1.3	1.4	1.5	1.6	1.7	1.8
Transportation	12.5	13.5	15.4	17.2	17.6	18.1	18.2
Treasury	50.5	56.3	63.4	71.0	75.6	77.1	79.1
Environmental Protection Agency	4.4	4.5	5.0	5.5	6.3	6.1	5.8
General Services Administration	-*	0.1	0.2	0.3	0.3	0.4	0.4
National Aeronautics and Space Administration	3.9	4.0	4.3	4.5	4.3	3.8	3.4
Veterans Administration	18.0	18.8	19.8	20.1	20.3	20.6	21.0
Other independent agencies	19.9	24.6	26.0	27.2	28.7	29.7	30.7
Allowances 3/	---	---	1.1	6.2	9.4	12.6	15.8
Undistributed offsetting receipts	-15.1	-16.1	-16.6	-17.3	-18.4	-19.8	-21.5
Total budget outlays	402.8	452.3	496.6	549.4	591.3	631.0	671.5

1/ The 1977 actual data have been adjusted for accounting changes. See general note with the Table of Contents.

2/ Includes allowances for civilian and military pay raises for the Department of Defense.

3/ Includes allowances for civilian agency pay raises and contingencies.

* $50 million or less.

Table 24.--BUDGET AUTHORITY BY FUNCTION, 1977-1983
(in billions of dollars)

	Actual	Current Estimate				Projection	
	1977 1/	1978	1979	1980	1981	1982	1983
National defense	110.4	118.0	128.3	139.7	151.8	164.3	177.4
International affairs	6.6	11.9	13.1	13.0	13.4	15.5	16.3
General science, space and technology	4.6	4.9	5.2	5.4	5.2	4.6	4.3
Energy	5.0	8.1	9.5	6.9	6.5	6.8	5.2
Natural resources and environment	9.5	13.1	13.6	13.9	13.7	13.5	13.3
Agriculture	2.4	3.9	7.2	4.7	5.0	5.5	5.0
Commerce and housing credit	5.5	5.4	6.7	8.2	7.9	7.9	7.6
Transportation	10.4	15.2	19.3	19.9	19.8	19.8	19.9
Community and regional development	12.8	9.7	12.7	13.6	13.5	12.6	12.7
Education, training, employment, and social services	30.4	22.3	35.6	33.2	37.5	40.2	40.7
Health	40.4	46.7	52.7	58.1	68.5	77.4	85.2
Income security	169.5	180.3	191.1	217.3	236.8	256.6	277.1
(Social security)	(80.0)	(88.1)	(101.1)	(116.0)	(134.2)	(152.3)	(168.0)
(Other)	(89.5)	(92.2)	(90.0)	(101.2)	(102.6)	(104.4)	(109.1)
Veterans benefits and services	19.1	19.1	19.7	20.2	20.5	20.8	21.2
Administration of justice	3.6	3.9	4.3	4.3	4.3	4.3	4.4
General government	3.9	4.0	4.3	4.6	4.4	4.3	4.3
General purpose fiscal assistance	9.3	9.7	14.6	16.6	20.3	21.6	20.3
Interest	38.1	43.8	49.0	55.7	59.4	59.1	58.6
Allowances	---	---	1.1	7.2	10.4	13.6	16.8
Undistributed offsetting receipts:							
Employer share, employee retirement	-4.5	-5.0	-5.1	-5.5	-5.9	-6.3	-6.7
Interest received by trust funds	-8.1	-8.6	-9.2	-10.0	-10.7	-11.7	-13.0
Rents and royalties on the Outer Continental Shelf	-2.4	-2.4	-2.3	-1.8	-1.8	-1.8	-1.8
Total budget authority	466.1	503.8	571.4	625.2	680.6	728.8	768.8
Memorandum							
Budget authority, off-budget Federal entities	10.0	14.2	16.1	11.7	12.2	14.2	13.7
Budget authority including off-budget Federal entities	476.1	518.0	587.5	636.9	692.8	743.0	782.5

1/ The 1977 actual data have been adjusted for accounting changes. See general note with the Table of Contents.

Table 25.--BUDGET AUTHORITY BY AGENCY, 1977-1983
(in billions of dollars)

	Actual	Current Estimate				Projection	
	1977 1/	1978	1979	1980	1981	1982	1983
Legislative branch	1.0	1.1	1.2	1.3	1.2	1.2	1.2
The Judiciary	0.4	0.5	0.5	0.5	0.6	0.6	0.6
Executive Office of the President	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Funds appropriated to the President	4.6	9.9	10.9	9.9	9.4	11.4	12.0
Agriculture	15.5	17.3	20.1	19.9	21.2	22.4	22.2
Commerce	8.2	2.4	4.1	4.7	4.3	3.2	3.3
Defense-Military 2/	108.4	115.5	125.5	136.9	149.0	161.6	174.7
Defense-Civil	2.5	2.7	3.0	3.2	3.2	3.0	2.8
Energy	6.6	10.3	11.6	9.1	8.5	8.5	6.6
Health, Education, and Welfare	147.6	162.4	187.3	206.5	237.2	264.9	289.7
Housing and Urban Development	33.9	38.1	33.8	40.6	40.5	40.7	40.8
Interior	3.7	4.5	4.7	4.8	4.7	4.6	4.6
Justice	2.3	2.4	2.6	2.6	2.6	2.6	2.6
Labor	31.2	20.0	28.6	28.4	29.8	30.8	31.6
State	1.2	1.5	1.5	1.7	1.7	1.8	1.9
Transportation	9.3	13.6	17.6	18.1	18.2	18.4	18.6
Treasury	50.3	56.5	68.6	77.8	85.7	87.9	87.8
Environmental Protection Agency	2.8	5.5	5.7	5.6	5.6	5.6	5.6
General Services Administration	0.3	0.2	0.3	0.3	0.3	0.3	0.4
National Aeronautics and Space Administration	3.8	4.1	4.4	4.6	4.2	3.6	3.2
Veterans Administration	19.0	19.0	19.7	20.2	20.4	20.8	21.2
Other independent agencies	28.3	32.4	35.2	38.4	40.3	40.9	41.9
Allowances 3/	---	---	1.1	7.2	10.4	13.6	16.8
Undistributed offsetting receipts	-15.1	-16.1	-16.6	-17.3	-18.4	-19.8	-21.5
Total budget authority	466.1	503.8	571.4	625.2	680.6	728.8	768.8

1/ The 1977 actual data have been adjusted for accounting changes. See general note with the Table of Contents.

2/ Includes allowances for civilian and military pay raises for the Department of Defense.

3/ Includes allowances for civilian agency pay raises and contingencies.

Table 26.--PROJECTIONS OF OUTLAYS FOR OPEN-ENDED PROGRAMS AND FIXED COSTS, 1979-1983*

(in billions of dollars)

	Estimate			Projection	
Open-Ended Programs and Fixed Costs	1979	1980	1981	1982	1983
Payments for individuals:					
Social security and railroad retirement........	107.4	119.4	131.9	145.1	158.1
Military retired pay..........................	10.2	11.2	12.2	13.2	14.1
Other Federal employees retirement and insurance................................	12.3	13.7	15.2	16.7	18.1
Unemployment assistance.......................	12.0	11.9	11.6	10.9	10.6
Veterans benefits.............................	12.6	12.2	11.8	11.4	11.1
Medicare and medicaid.........................	41.7	47.8	54.6	62.0	70.2
Housing payments..............................	4.2	5.1	6.2	7.4	8.7
Public assistance and related programs.........	22.9	25.1	26.2	27.3	28.9
Subtotal, Payments for individuals........	223.2	246.4	269.6	293.9	319.9
Net interest..................................	39.9	45.7	48.7	47.4	45.6
General revenue sharing.......................	6.9	6.9	6.9	6.9	6.9
Other open-ended programs and fixed costs.........	15.1	13.1	11.5	11.4	12.6
Total, Open-ended programs and fixed costs............................	285.0	312.1	336.7	359.6	385.0

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* This table is supplied pursuant to the requirements of Section 221(b) of the Legislative Reorganization Act of 1970 (P.L. 91-510).

Table 27.--ESTIMATED SPENDING FROM END OF FISCAL YEAR 1979 BALANCES OF BUDGET AUTHORITY: NON-MANDATORY PROGRAMS
(in billions of dollars)

○

	Federal Guarantee and Insurance Programs: Reserves for Losses, and Standby and Backup Authority	Other Unexpended Balances, September 30, 1979	Total
Total balances, end of 1979 (current estimate)..........	16.4	259.6	276.1
	=====	=====	=====
Spending from balances in:			
1980......................	0.7	127.3	127.9
1981......................	0.6	59.9	60.5
1982......................	0.6	26.3	26.9
1983......................	0.5	11.7	12.1
Expiring balances, 1980 through 1983................	---	19.5	19.5
Unexpended balances as of the end of 1983.............	14.1	15.0	29.1